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THE EUPHAUSIACEA AND MYSIDACEA OF THE JOHN MURRAY EXPEDITION TO THE INDIAN OCEAN

BY

W. M. TATTERSALL, D.Sc.

WITH TWENTY-ONE TEXT-FIGURES

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THE EUPHAUSIACEA AND MYSIDACEA OF THE JOHN MURRAY EXPEDITION TO THE INDIAN OCEAN

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WITH TWENTY-ONE TEXT-FIGURES.

I AM indebted to the courtesy of Lt.-Col. R. B. Seymour Sewell, C.I.E., F.R.S., for the opportunity of examining and reporting on the collections of Euphausiacea and Mysidacea collected by the John Murray Expedition to the Indian Ocean.

EUPHAUSIACEA.—Twenty-eight species are represented in the collection. None is new to science, and all have been recorded from some part of the Indian Ocean by earlier workers. The first Euphausian to be recorded from the Indian Ocean was *Thysanopoda obtusifrons* G. O. Sars by Alcock and Anderson (1894). In 1906 I recorded three species, *Euphausia mutica* Hansen, *Pseudeuphausia latifrons* (G. O. Sars) and *Nematoscelis microps* G. O. Sars, from stations in the Indian Ocean, and Hansen (1910) mentions *Euphausia mutica* Hansen and *Euphausia diomedeae* Ortm. from the same waters. The first comprehensive collection of Euphausiacea from the Indian Ocean was that made by Prof. Stanley Gardiner during the Sealark Expedition to the Seychelles and neighbouring seas, and reported on by me (1911 (2)). Twenty-two species were listed from that collection. Colosi (1917) recorded *Nematoscelis microps* G. O. Sars, *Stylocheiron armatum* Colosi and *Stylocheiron abbreviatum* G. O. Sars, and, in 1934 (1), Torelli gave a list of fifteen species, chiefly from the Red Sea and the Gulf of Aden. In the following table I have summarized all the earlier records of Euphausiacea from the Indian Ocean, and added for comparison the species collected by the Siboga Expedition (Hansen, 1910) and those in the present collection.

Table Showing the Species of Euphausiacea Known from the Indian Ocean and Neighbouring Waters.

	Tattersall, 1911(2), Seychelles.	Illig, 1930, Indian Ocean generally.	Torelli, 1934(1), Red Sea, etc.	Hansen, 1910, Siboga.	John Murray Expedition.	Other records.
Bentheuphausia amblyops	..	×	..	×	×	Anderson, 1897, Bay of Bengal.
Thysanopoda tricuspidata	×	×	..	×	×	..
T. monacantha	×	×	×	×	×	..
T. æqualis	×	×	..	×	×	..
T. pectinata	×	×	..	..	×	..
T. acutifrons	..	×	×	..	..	..
T. orientalis	..	×	×	×	×	..
T. microphthalma	×	×	..	..	..	Wood-Mason and Alcock, 1891, Bay of Bengal.
T. obtusifrons	..	×	..	..	×	Alcock and Anderson, 1894.
T. cornuta	..	×	..	..	×	..
Euphausia eximia	..	..	..	..	..	Torelli, 1934 (2).
E. diomedeae	..	×	×	×	×	Hansen, 1910 ; Torelli, 1934 (2).
E. messanensis	..	..	×	..	..	..
E. mutica	×	×	..	×	..	Tattersall, 1906 ; Hansen, 1910.
E. recurva	..	×	..	..	..	..
E. brevis	..	×	..	..	×	..
E. similis	×	×	..	×	×	..
E. tenera	×	×	..	×	×	..
E. hemigibba	×	..	..	×	..	..
E. pseudogibba	..	×	..	×	×	..
E. paragibba	×	×	..	×	×	..
E. distinguenda	..	×	×	..	×	..
E. sibogae	..	..	..	×	..	..
E. gibboides	..	×	..	..	×	..
E. sanzoi	..	..	×	..	..	..
Pseudeuphausia latifrons	×	×	×	×	×	Tattersall, 1906.
P. colosii	..	..	×	..	..	..
Thysanaessa inermis	..	×	..	..	..	..
Nematoscelis megalops	..	×	..	..	..	..
N. microps	×	×	..	×	×	Tattersall, 1906 ; Colosi, 1917.
N. gracilis	×	×	×	×	×	..
N. tenella	×	×	..	×	×	..
Nematobrachion boöpis	×	×	..	×	×	..
N. flexipes	×	×	..	..	×	..
Stylocheiron carinatum	×	×	..	×	×	..
S. armatum	..	..	×	..	..	Colosi, 1917.
S. affine	..	×	×	×	×	..
S. insulare	..	..	..	×	..	..
S. suhmii	×	×	×	..	..	..
S. microphthalma	×	×	..	×	..	..
S. longicorne	×	×	×	×	×	..
S. elongatum	×	×	..	..	×	..
S. maximum	..	×	..	×	×	..
S. abbreviatum	×	×	×	×	×	Colosi, 1917.

The total number of species in this table is forty-two, some of which are, however, of doubtful value. Of these the John Murray Expedition collected twenty-eight. The collection may, therefore, be regarded as a very representative one for the region surveyed. I have not attempted to deal further with the distribution of the individual species of Euphausians.

MYSIDACEA.—It is not possible to deal in the same way with the Mysidacean fauna of the Indian Ocean. The Euphausiacea are all pelagic and oceanic forms, but there are littoral and shallow-water as well as pelagic oceanic Mysids, and a summary of all the species known from the area surveyed by the John Murray Expedition would of necessity have to include both ecological types. It is felt that such a summary is beyond the scope of this report.

The collection includes twenty-seven species as compared with fourteen collected by the " Sealark ", twenty-seven by the " Valdivia " in the same waters, and forty-four by the " Siboga " in the waters of the East Indies. The comparison made with the " Siboga " Expedition is not, in reality, a strict one. The latter expedition, working among the islands of the East Indian Archipelago, collected vast numbers of shallow-water pelagic species, belonging mainly to the *Siriellinae* and *Gastrosaccinae*. The John Murray Expedition collected only oceanic forms, with one exception, *Lophogaster rotundatus* Illig, and the collection is deficient in species of *Siriella* and *Gastrosaccus* accordingly.

Three species are described as new to science, *Boreomysis verrucosa*, *Dactylamblyops murrayi* and *Thalassomysis sewelli*, a new genus of exceptional interest, which presents a number of unusual features. A further six species are recorded for the first time from the Indian Ocean, viz. *Gnathophausia gigas* W.-Suhm, *Gnathophausia elegans* G. O. Sars, *Eucopia major* Hansen, *Boreomysis microps* G. O. Sars, *Synerythrops intermedia* Hansen, and *Euchaetomera glyphidophthalma* Illig. The collection as a whole is typical of the Mysidacea of the oceanic bathypelagic fauna and a witness to the general world-wide distribution of the deep-water fauna.

A problem of some interest is presented by the geographical distribution of the species *Petalophthalmus oculatus* Illig. It is known only from deep water in the Indian Ocean and in the Caribbean Sea. It may be that this apparent discontinuous distribution is merely due to the lack of material from intermediate localities, and will disappear with further and more extended deep-sea biological investigation. Barnard, however, in his report on the Amphipoda of this Expedition, has made an interesting suggestion to account for the similar discontinuous distribution of two species of Amphipods common to the Atlantic and Indian Oceans. He asks whether it is too unreasonable to regard these deep-water forms as relics of the Cretaceo-Tertiary Sea of Tethys. It seems to me that this suggestion is worthy of further consideration. The pelagic fauna of the old Tethys Sea may be presumed to have been generally distributed throughout that area at one time, but with the evolution of new and more virile types to have become extinct or to have sought refuge in the deep-water pockets of that ocean and so, comparatively, to have escaped the more intensive competition of more populated areas. With the subsequent breaking up of the Tethys Sea these deep-water pockets have become isolated in the Atlantic and Pacific Indian Oceans of to-day with such of the fauna as has survived. *Petalophthalmus*, though undoubtedly specialized in many ways to its deep-water habitat, is, I think, a derivative from more primitive stock than the majority of present-day Mysids, and it is precisely such primitive forms which might be expected to survive under such conditions.

LIST OF SPECIES COLLECTED.

Euphausiacea.

Euphausiidae :
- *Bentheuphausia amblyops* (G. O. Sars).
- *Thysanopoda tricuspidata* H. M.-Edw.
- *T. monacantha* Ortm.
- *T. æqualis* Hansen.
- *T. pectinata* Ortm.
- *T. orientalis* Hansen.
- *T. obtusifrons* G. O. Sars.
- *T. cornuta* Illig.
- *Euphausia diomedeae* Ortm.
- *E. brevis* Hansen.
- *E. similis* G. O. Sars.
- *E. tenera* Hansen.
- *E. pseudogibba* Ortm.
- *E. paragibba* Hansen.

Euphausiidae (cont.) :
- *E. distinguenda* Hansen.
- *E. gibboides* Ortm.
- *Pseudeuphausia latifrons* (G. O. Sars).
- *Nematoscelis microps* G. O. Sars.
- *N. gracilis* Hansen.
- *N. tenella* G. O. Sars.
- *Nematobrachion boöpis* (Calman).
- *N. flexipes* (Ortm.).
- *Stylocheiron carinatum* G. O. Sars.
- *S. affine* Hansen.
- *S. longicorne* G. O. Sars.
- *S. elongatum* G. O. Sars.
- *S. maximum* Hansen.
- *S. abbreviatum* G. O. Sars.

Mysidacea.

Lophogastridae :
- *Lophogaster rotundatus* Illig.
- *Gnathophausia ingens* (Dohrn.).
- *G. gigas* W.-Suhm.
- *G. gracilis* W.-Suhm.
- *G. zoea* W.-Suhm var. *scapularis* Ortm.
- *G. elegans* G. O. Sars.

Eucopiidae :
- *Eucopia sculpticauda* Faxon.
- *E. unguiculata* W.-Suhm.
- *E. major* Hansen.

Petalophthalmidae :
- *Petalophthalmus armiger* W.-Suhm.
- *P. oculatus* Illig.

Mysidae :
- *Boreomysis microps* G. O. Sars.
- *B. spinifera* Coifmann.
- *B. verrucosa* n. sp.
- *Siriella thompsonii* H. M.-Edw.
- *S. gracilis* Dana.
- *Meterythrops indica* Hansen.
- *Dactylamblyops murrayi* n. sp.
- *Synerythrops intermedia* Hansen.
- *Thalassomysis sewelli* gen. et sp. nov.
- *Euchætomera typica* G. O. Sars.
- *E. tenuis* G. O. Sars.
- *E. oculata* Hansen.
- *E. glyphidophthalma* Illig.
- *Echinomysis chuni* Illig.
- *Gibberythrops acanthura* (Illig).
- *G. brevisquamosa* (Illig).

LIST OF STATIONS AT WHICH EUPHAUSIACEA AND MYSIDACEA WERE CAPTURED, WITH THE SPECIES OBTAINED AT EACH STATION.

Red Sea.

St. 5. 13.ix.33. N. 200. 500–0 m. 900 m.w.o. Oblique.

Euphausia diomedeae Ortm., *Euphausia gibboides* Ortm., *Stylocheiron abbreviatum* G. O. Sars.

Gulf of Aden.

St. 18. 21.ix.33. N. 200. 900–0 m. 1500 m.w.o. Oblique.

Thysanopoda orientalis Hansen, *Euphausia diomedeae* Ortm., *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion flexipes* (Ortm.), *Boreomysis spinifera* Coif.

St. 25. 10.x.33. Agassiz Trawl. 620 m.

Euphausia diomedeae Ortm., *Nematoscelis gracilis* Hansen, *Nematobrachion flexipes* (Ortm.), *Synerythrops intermedia* Hansen.

Northern Arabian Sea.

St. 61 A–B. 8.xi.33. Day. N.S. 50. Surface.

Pseudeuphausia latifrons (G. O. Sars).

St. 61 A–B. 8.xi.33. Day. N. 100. 500–0 m. 570 m.w.o.

Euphausia diomedeae Ortm., *Euphausia distinguenda* Hansen, *Stylocheiron affine* Hansen.

St. 61 A–B. 8.xi.33. Day. N. 100. 1000–0 m. 1136 m.w.o.

Euphausia diomedeae Ortm., *Euphausia distinguenda* Hansen, *Stylocheiron affine* Hansen.

St. 61 A–B. 8.xi.33. Day. N. 100. 1500–0 m. 1702 m.w.o.

Bentheuphausia amblyops (G. O. Sars), *Euphausia diomedeae* Ortm., *Euphausia distinguenda* Hansen, *Gnathophausia gigas* W.-Suhm, *Gnathophausia zoea* W.-Suhm var. *scapularis* Ortm., *Eucopia unguiculata* W.-Suhm.

St. 61 A–B. 8.xi.33. Day. N. 200. 2000–0 m. 2265 m.w.o.

Bentheuphausia amblyops (G. O. Sars), *Euphausia distinguenda* Hansen, *Gnathophausia zoea* W.-Suhm var. *scapularis* Ortm.

St. 61 C–D. 8.xi.33. Night. N.S. 50. Surface.

Siriella thompsonii H. M.-Edw., *Siriella gracilis* Dana, *Euphausia diomedeae* Ortm., *Euphausia distinguenda* Hansen, *Pseudeuphausia latifrons* (G. O. Sars).

St. 61 C–D. 9.xi.33. Night. N. 100. 500–0 m. 570 m.w.o.

Euphausia distinguenda Hansen, *Stylocheiron affine* Hansen.

St. 61 C–D. 9.xi.33. Night. N. 100. 1000–0 m. 1136 m.w.o.

Euphausia diomedeae Ortm., *Euphausia distinguenda* Hansen, *Pseudeuphausia latifrons* (G. O. Sars), *Stylocheiron affine* Hansen, *Siriella gracilis* Dana.

St. 61 C–D. 9.xi.33. Night. N. 100. 1500–0 m. 1702 m.w.o.

Euphausia diomedeae Ortm., *Euphausia distinguenda* Hansen, *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Gnathophausia zoea* W.-Suhm var. *scapularis* Ortm., *Eucopia major* Hansen, *Boreomysis spinifera* Coifmann, *Boreomysis verrucosa* n. sp., *Siriella gracilis* Dana, *Dactylamblyops murrayi* n. sp., *Thalassomysis sewelli* n. sp.

St. 61 C–D. 9.xi.33. Night. N. 200. 2000–0 m. 2265 m.w.o.

Bentheuphausia amblyops (G. O. Sars), *Euphausia diomedeae* Ortm., *Euphausia distinguenda* Hansen, *Stylocheiron affine* Hansen, *Gnathophausia gracilis* W.-Suhm, *Gnathophausia zoea* W.-Suhm var. *scapularis* Ortm.

Gulf of Oman.

St. 76. 29.xi.33. N. 100. 200–0 m. 300 m.w.o.

Euphausia distinguenda Hansen, *Stylocheiron affine* G. O. Sars, *Stylocheiron longicorne* G. O. Sars.

St. 76. 29.xi.33. N. 100. 600–0 m. 800 m.w.o.

Euphausia diomedeae Ortm., *Euphausia distinguenda* Hansen, *Nematoscelis gracilis* Hansen, *Nematobrachion flexipes* (Ortm.), *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars.

St. 76. 29.xi.33. N. 100. 1500–0 m. 1800 m.w.o.

Euphausia diomedeae Ortm., *Euphausia distinguenda* Hansen, *Nematobrachion flexipes* (Ortm.), *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars.

St. 76. 29.xi.33. N. 200. 2500–0 m. 2800 m.w.o.

Bentheuphausia amblyops (G. O. Sars), *Euphausia diomedeae* Ortm., *Euphausia distinguenda* Hansen, *Gnathophausia gracilis* W.-Suhm, *Gnathophausia zoea* W.-Suhm var. *scapularis* Ortm., *Boreomysis verrucosa* n. sp.

Northern Arabian Sea.

St. 85. 6.xii.33. Monegasque trawl. 1519–1705 m.

Gnathophausia gracilis W.-Suhm, *Gnathophausia zoea* W.-Suhm var. *scapularis* Ortm.

Central Arabian Sea.

St. 95. 18.xii.33. N. 200. 400–984 m. 1400 m.w.o.

Thysanopoda monacantha Ortm., *Euphausia diomedeae* Ortm., *Nematoscelis gracilis* Hansen, *Nematobrachion flexipes* (Ortm.), *Stylocheiron maximum* Hansen, *Eucopia unguiculata* W.-Suhm.

St. 96. 19.xii.33. N. 200. 400–645 m. 900 m.w.o.

Thysanopoda tricuspidata H. M.-Edw., *Thysanopoda monacantha* Ortm., *Thysanopoda aequalis* Hansen, *Thysanopoda pectinata* Ortm., *Thysanopoda orientalis* Hansen, *Thysanopoda* sp., *Euphausia diomedeae* Ortm., *Euphausia tenera* Hansen, *Euphausia paragibba* Hansen, *Euphausia distinguenda* Hansen, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion boöpis* (Calman), *Stylocheiron carinatum* G. O. Sars, *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Stylocheiron elongatum* G. O. Sars, *Stylocheiron maximum* Hansen, *Stylocheiron abbreviatum* G. O. Sars, *Eucopia unguiculata* W.-Suhm, *Boremomysis microps* G. O. Sars, *Siriella gracilis* Dana, *Meterythrops indica* Hansen, *Euchaetomera oculata* Hansen, *Gibberythrops acanthura* (Illig.).

St. 98. 22.xii.33. N. 200. 2800–0 m.

Euphausia diomedeae Ortm., *Euphausia similis* G. O. Sars, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion flexipes* (Ortm.), *Gnathophausia ingens* (Dohrn), *Eucopia unguiculata* W.-Suhm, *Eucopia sculpticauda* Faxon.

Zanzibar Area.

St. 104. 11.i.34. Grab. 207 m.

Lophogaster rotundatus Illig.

St. 105. 11.i.34. Grab. 280 m.

Lophogaster rotundatus Illig.

St. 120. 20.i.34. Agassiz trawl. 2926 m.

Stylocheiron maximum Hansen, *Eucopia sculpticauda* Faxon.

St. 121. 21.i.34. Agassiz trawl.

Nematoscelis tenella G. O. Sars, *Gnathophausia ingens* (Dohrn).

Southern Arabian Sea (Seychelles).

St. 131 A. 10.ii.34. N. 200. 600–0 m. Vertical.

Thysanopoda tricuspidata H. M.-Edw., *Thysanopoda aequalis* Hansen, *Thysanopoda obtusifrons* G. O. Sars, *Euphausia similis* G. O. Sars, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion boöpis* (Calman).

St. 131 D. 11.ii.34. N. 100. 500–0 m. Vertical.

Thysanopoda aequalis Hansen, *Thysanopoda orientalis* Hansen, *Thysanopoda* sp., *Euphausia brevis* Hansen, *Euphausia diomedeae* Ortm., *Euphausia tenera* Hansen, *Euphausia similis* G. O. Sars, *Nematoscelis gracilis* Hansen, *Nematobrachion boöpis* (Calman), *Stylocheiron carinatum* G. O. Sars, *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Stylocheiron elongatum* G. O. Sars, *Stylocheiron abbreviatum* G. O. Sars, *Euchaetomera tenuis*, G. O. Sars.

St. 131 D. 11.ii.34. N. 100. 1500–0 m. Vertical.

Thysanopoda aequalis Hansen, *Thysanopoda orientalis* Hansen, *Thysanopoda* sp., *Euphausia diomedeae* Ortm., *Euphausia tenera* Hansen, *Euphausia similis* G. O. Sars, *Euphausia paragibba* Hansen, *Euphausia distinguenda* Hansen, *Nematoscelis gracilis* Hansen, *Nematobrachion boöpis* (Calman), *Stylocheiron carinatum* G. O. Sars, *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Stylocheiron abbreviatum* G. O. Sars, *Eucopia unguiculata* W.-Suhm, *Petalophthalmus oculatus* Illig.

St. 131 D. 11.ii.34. N. 200. 2500–0 m. Vertical.

Thysanopoda tricuspidata H. M.-Edw., *Thysanopoda monacantha* Ortm., *Thysanopoda obtusifrons* G. O. Sars, *Thysanopoda pectinata* Ortm., *Euphausia diomedeae* Ortm., *Euphausia similis* G. O. Sars, *Euphausia paragibba* Hansen, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion boöpis* (Calman), *Eucopia unguiculata* W.-Suhm.

Maldive Area.

St. 145 C. 1.iv.34. Day. N. 100. 300–0 m. Vertical.

Euphausia diomedeae Ortm., *Euphausia tenera* Hansen, *Euphausia pseudogibba* Ortm., *Nematoscelis gracilis* Hansen.

St. 145 C. 1.iv.34. Day. N. 100. 400–0 m. Vertical.

Euphausia distinguenda Hansen, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars.

St. 145 D. 2.iv.43. Night. N. 100. 50–0 m. Vertical.

Euphausia diomedeae Ortm., *Euphausia tenera* Hansen, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars.

St. 145 D. 2.iv.34. Night. N. 100. 100–0 m. Vertical.

Thysanopoda pectinata Ortm., *Euphausia diomedeae* Ortm., *Euphausia tenera* Hansen, *Euphausia pseudogibba* Ortm., *Nematoscelis gracilis* Hansen, *Stylocheiron carinatum* G. O. Sars, *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Stylocheiron abbreviatum* G. O. Sars.

St. 145 D. 2.iv.34. Night. N. 100. 300–0 m. Vertical.

Thysanopoda monacantha Ortm., *Euphausia diomedeae* Ortm., *Euphausia tenera* Hansen, *Euphausia pseudogibba* Ortm., *Nematoscelis gracilis* Hansen, *Stylocheiron carinatum* G. O. Sars, *Stylocheiron longicorne* G. O. Sars.

St. 145 D. 2.iv.34. Night. N. 100. 400–0 m. Vertical.

Euphausia diomedeae Ortm., *Euphausia tenera* Hansen, *Euphausia pseudogibba* Ortm., *Nematoscelis gracilis* Hansen, *Nematobrachion boöpis* (Calman), *Stylocheiron carinatum* G. O. Sars, *Stylocheiron affine* Hansen, *Stylocheiron abbreviatum* G. O. Sars.

Maldive Area.

St. 158. 7.iv.34. Agassiz trawl. 786–1170 m.

Gnathophausia elegans G. O. Sars.

St. 162. 10.iv.34. Agassiz trawl. 1829–2051 m.

Thysanopoda monacantha Ortm., *Eucopia unguiculata* W.-Suhm.

Central Arabian Sea.

St. 170. 27.iv.34. Agassiz trawl. 3676 m.

Thysanopoda orientalis Hansen, *Thysanopoda cornuta* Illig, *Gnathophausia ingens* (Dohrn), *Eucopia sculpticauda* Faxon.

St. 172. 29.iv.34. N. 100. 200–0 m. 510 m.w.o.

Euphausia diomedeae Ortm., *Euphausia distinguenda* Hansen, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion flexipes* (Ortm.), *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Stylocheiron elongatum* G. O. Sars, *Stylocheiron maximum* Hansen, *Stylocheiron abbreviatum* G. O. Sars, *Euchaetomera typica* G. O. Sars.

St. 172. 29.iv.34. N. 100. 400–0 m. 820 m.w.o.

Thysanopoda monacantha Ortm., *Thysanopoda aequalis* Hansen, *Thysanopoda pectinata* Ortm., *Thysanopoda orientalis* Hansen, *Euphausia diomedeae* Ortm., *Euphausia tenera* Hansen, *Euphausia paragibba* Hansen, *Euphausia distinguenda* Hansen, *Nematoscelis microps* G. O. Sars, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Stylocheiron carinatum* G. O. Sars, *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Stylocheiron elongatum* G. O. Sars, *Stylocheiron maximum* Hansen, *Stylocheiron abbreviatum* G. O. Sars, *Echinomysis chuni* Illig.

St. 172. 29.iv.34. N. 100. 850–0 m. 1500 m.w.o.

Thysanopoda monacantha Ortm., *Thysanopoda orientalis* Hansen, *Euphausia diomedeae* Ortm., *Euphausia tenera* Hansen, *Euphausia similis* G. O. Sars, *Euphausia paragibba* Hansen, *Euphausia distinguenda* Hansen, *Nematoscelis microps* G. O. Sars, *Nematoscelis gracilis* Hansen, *Nematocelis tenella* G. O. Sars, *Stylocheiron carinatum* G. O. Sars, *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Stylocheiron elongatum* G. O. Sars, *Stylocheiron maximum* Hansen, *Stylocheiron abbreviatum* G. O. Sars, *Eucopia unguiculata* W.-Suhm, *Boreomysis microps* G. O. Sars.

St. 172. 29.iv.34. N. 200. 2091–0 m. 2665 m.w.o.

Bentheuphausia amblyops (G. O. Sars), *Thysanopoda monacantha* Ortm., *Thysanopoda orientalis* Hansen, *Euphausia diomedeae* Ortm., *Nematoscelis microps* G. O. Sars, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion flexipes* (Ortm.), *Stylocheiron maximum* Hansen, *Eucopia sculpticauda* Faxon, *Eucopia unguiculata* W.-Suhm, *Boreomysis microps* G. O. Sars, *Boreomysis verrucosa* n. sp.

Gulf of Aden.

St. 184. 4.v.34. Agassiz trawl. 1270 m.

Petalophthalmus armiger W.-Suhm.

St. 185. 5.v.34. Agassiz trawl. 2000 m.

Nematoscelis gracilis Hansen.

St. 186. 5.v.34. N. 100. 250–0 m. 510 m.w.o.

Euphausia distinguenda Hansen, *Nematoscelis gracilis* Hansen, *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Stylocheiron maximum* Hansen.

St. 186. 5.v.34. N. 100. 575–0 m. 880 m.w.o.

Thysanopoda orientalis Hansen, *Euphausia diomedeae* Ortm., *Euphausia distinguenda* Hansen, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion flexipes* (Ortm.), *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Stylocheiron maximum* Hansen, *Euchaetomera glyphidophthalma* Illig, *Gibberythrops acanthura* (Illig).

St. 186. 5.v.34. N. 100. 600–0 m. 1150 m.w.o.

Thysanopoda orientalis Hansen, *Euphausia diomedeae* Ortm., *Euphausia distinguenda* Hansen, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion flexipes* (Ortm.), *Stylocheiron affine* Hansen, *Stylocheiron longicorne* G. O. Sars, *Gibberythrops acanthura* (Illig), *Gibberythrops brevisquamosa* (Illig).

St. 186. 5.v.34. N. 200. 952–0 m. 1500 m.w.o.

Thysanopoda monacantha Ortm., *Thysanopoda orientalis* Hansen, *Nematoscelis gracilis* Hansen, *Nematoscelis tenella* G. O. Sars, *Nematobrachion flexipes* (Ortm.), *Stylocheiron longicorne* G. O. Sars, *Stylocheiron maximum* Hansen.

EUPHAUSIACEA.

Family Euphausiidae.

Genus *Bentheuphausia* G. O. Sars.

Bentheuphausia amblyops (G. O. Sars).

Bentheuphausia amblyops, G. O. Sars, 1885; Anderson, 1897; Hansen, 1910 and 1912; Illig, 1930.
Euphausia simplex, W.-Suhm, 1875.

Occurrence:

St. 61 A–B. N. 100. 1500–0 m. 1702 m.w.o. One female, 28 mm.
St. 61 A–B. N. 200. 2000–0 m. 2265 m.w.o. One female, 28 mm.
St. 61 C–D. N. 200. 2000–0 m. 2265 m.w.o. Two females, 23–32 mm.
St. 76. N. 200. 2500 m. 2800 m.w.o. Three females, 17–30 mm.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. One female, 15 mm.

Genus *Thysanopoda* M.-Edw.

Thysanopoda tricuspidata M.-Edw.

Thysanopoda tricuspidata, G. O. Sars, 1885; Hansen, 1910, 1911 and 1912; Illig, 1930.

Occurrence:

St. 96. N. 200. 400–645 m. 900 m.w.o. One, immature, 11 mm.
St. 131 A. N. 200. 600 m. One, 19 mm.
St. 131 D. N. 200. 2500–0 m. One, 14 mm.

Thysanopoda monacantha Ortm.

Thysanopoda monacantha, Ortm., 1893 ; Hansen, 1910, 1911 and 1912 ; Illig, 1930.
Thysanopoda agassizi, Ortm., 1894.
Thysanopoda lateralis, Hansen, 1905 (1).
Thysanopoda ctenophora, Illig, 1908.

Occurrence :

St. 95. N. 200. 430–984 m. 1400 m.w.o. Two.
St. 96. N. 200. 400–645 m. 900 m.w.o. Ninety.
St. 131 D. N. 200. 2500 m. One.
St. 145 D. N. 100. 300–0. Three.
St. 162. Agassiz trawl. 1829–2051 m. Two.
St. 172. N. 100. 400–0 m. 820 m.w.o. Six.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Nine.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. Thirty-six.
St. 186. N. 200. 952–0 m. 1500 m.w.o. Two.

Thysanopoda aequalis Hansen.

Thysanopoda aequalis, Hansen, 1905 (2), 1910, 1911 and 1912 ; Illig, 1930.
Thysanopoda obtusifrons, Lo Bianco, 1903.
Thysanopoda microphthalma, Lo Bianco, 1903.

Occurrence :

St. 96. N. 200. 400–645 m. 900 m.w.o. Four.
St. 131 A. N. 200. 600–0 m. One.
St. 131 D. N. 100. 500–0 m. Two.
St. 131 D. N. 100. 1500–0 m. Two.
St. 172. N. 100. 400–0 m. 820 m.w.o. One.

Thysanopoda obtusifrons G. O. Sars.

Thysanopoda obtusifrons, G. O. Sars, 1885 ; Hansen, 1910, 1911 and 1912 ; Illig, 1930.
Thysanopoda vulgaris, Hansen, 1905 (1).

Occurrence :

St. 131 A. N. 200. 600–0 m. One.
St. 131 D. N. 200. 2500–0 m. One.

Thysanopoda pectinata Ortm.

Thysanopoda pectinata, Ortm., 1893 ; Hansen, 1910, 1911 and 1912 ; Illig, 1930.
Parathysanopoda foliifera, Illig, 1909.

Occurrence :

St. 96. N. 200. 400–645 m. 900 m.w.o. Eleven.
St. 131 D. N. 200. 2500 m. One male, 33 mm.
St. 145 D. N. 100. 100–0 m. Two, immature.
St. 172. N. 100. 400–0 m. 820 m.w.o. One.

Remarks.—The two immature specimens from St. 145 both possess a lateral spine on the margin of the carapace. All the other specimens, which are adult, have no such spine.

Thysanopoda orientalis Hansen.

Thysanopoda orientalis, Hansen, 1910, 1911 and 1912; Illig, 1930.

Occurrence:

St. 18. N. 200. 900–0 m. 1500 m.w.o. Six.
St. 96. N. 200. 400–645 m. 900 m.w.o. Twenty-one.
St. 131 D. N. 100. 500–0 m. One, immature.
St. 131 D. N. 100. 1500–0 m. Two.
St. 170. Agassiz trawl. 3676 m. One adult male.
St. 172. N. 100. 400–0 m. 820 m.w.o. Twenty-five.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Nine.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. Twelve.
St. 186. N. 100. 575–0 m. 880 m.w.o. Nineteen.
St. 186. N. 100. 600–0 m. 1150 m.w.o. Seven.
St. 186. N. 200. 952–0 m. 1500 m.w.o. Thirty.

Remarks.—The young specimens of this species, like those of *T. pectinata*, possess a spine on the lower margin of the carapace.

Thysanopoda cornuta Illig.

Thysanopoda cornuta, Illig, 1905 (1) and 1930; Hansen, 1910, 1911 and 1912.
Thysanopoda insignis, Hansen, 1905 (1).

Occurrence:

St. 170. Agassiz trawl. 3676 m. One male, 58 mm.

Remarks.—This male specimen agrees with the figure given by Illig (1930) for a specimen which measured 79 mm. The antennular peduncles are somewhat stouter than in female specimens, and there is a dense tuft of fine setæ at the base of the outer flagellum. The condition is, in fact, quite similar to that described by Hansen for the male of *T. egregia*. The thickened antennular peduncles and the tuft of setæ are secondary sexual characters of the male and not specific characters. Illig has figured the copulatory organ of the first pleopod of the male, but omits p5, which is present as a small curved hooked process behind p4 in the view drawn by Illig.

Thysanopoda sp. juv.

Occurrence:

St. 131 D. N. 100. 500–0 m. Three.
St. 131 D. N. 100. 1500–0 m. One.

Remarks.—These specimens are too immature to determine with certainty. They probably belong to *T. monacantha* Ortm.

Thysanopoda sp. (*cornuta* group).

Occurrence:

St. 96. N. 200. 400–0 m. 900 m.w.o. One, 13 mm.
St. 131 D. N. 100. 1500–0 m. One, 9 mm.

Remarks.—Larval forms belonging to the *Thysanopoda cornuta* group of species have been described by Hansen (1912), Zimmer (1914), Tattersall (1926) and Illig (1930).

They agree in being of large size and of robust and clumsy form, but can be divided into two species, (A) those larvæ described by Hansen, Zimmer and all but one of those described by Illig, and (B) those described by Tattersall, one of those described by Illig and the specimens here recorded.

Species A :

Hansen, 1912, p. 224, pl. 6, figs. 1 *a–e*.
Zimmer, 1914, p. 419, pl. xxvi, figs. 55–58.
Illig, 1930, p. 516, figs. 199–204.

This species is characterized by (1) ripple-like markings on the postero-lateral parts of the carapace; these are not mentioned by Hansen, but are conspicuous features of both Zimmer's and Illig's figures; (2) a broad rostral plate, with the antero-lateral angles rounded, produced in the mid-dorsal line into a very short acute spine hardly extending beyond the level of the antero-lateral corners, so that the anterior margin of the rostral plate is almost transverse; and (3) the presence of a long spiniform process from the dorso-lateral margin of the sixth abdominal somite.

Species B :

Tattersall, 1926, p. 15, pl. 2, figs. 9–11.
Illig, 1930, p. 518, figs. 207–209.

This species is characterized by (1) the absence of ripple markings on the carapace; (2) a narrower rostral plate than in Species A, in which the lateral margins are somewhat convergent instead of being parallel, and the anterior margin is produced in the mid-dorsal line into a rather long rostral spine, which extends well beyond the antero-lateral corners; and (3) the absence of a spiny prolongation from the dorso-lateral margin of the sixth abdominal somite. The Murray specimens belong to Species B.

There are two known species of adult *Thysanopoda* which belong to the *cornuta* group, *T. cornuta* Illig and *T. egregia* Hansen. Hansen identifies his specimens of the larva belonging to species A as the young stages of *T. cornuta*, and Illig accepts this conclusion. If they are correct in their conclusions it is reasonable to assume that the larvæ of species B are those of *T. egregia*. Only a more complete series of specimens of each form can decide this point. Illig recorded a larva of species B from the Indian Ocean near to the Seychelle Islands.

Genus *Euphausia* Dana.

Euphausia brevis Hansen.

Euphausia brevis, Hansen, 1905 (2), 1910, 1911 and 1912; Illig, 1930.

Occurrence :

St. 131 D. N. 100. 500–0 m. One.

Euphausia diomedeae Ortm.

Euphausia diomedeae, Ortmann, 1894; Hansen, 1905 (2), 1910, 1911 and 1912; Torelli, 1934 (1) and (2).

Occurrence :

St. 5. N. 200. 500–0 m. 900 m.w.o. Four.
St. 18. N. 200. 900–0 m. 1500 m.w.o. One.
St. 25. Agassiz trawl. 620 m. Two.
St. 61 A–B. N. 100. 500–0 m. 570 m.w.o. Sixteen.
St. 61 A–B. N. 100. 1000–0 m. 1136 m.w.o. Twenty.
St. 61 A–B. N. 100. 1500–0 m. 1702 m.w.o. One hundred and forty-eight.
St. 61 A–B. N. 200. 2000–0 m. 2265 m.w.o. Nineteen.
St. 61 C–D. N.S. 50. Surface. Fifteen, immature.
St. 61 C–D. N. 100. 1000–0 m. 1136 m.w.o. Eighty-two.
St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. Thirty-three.
St. 61 C–D. N. 200. 2000–0 m. 2265 m.w.o. Eleven.
St. 76. N. 100. 600 m. 800 m.w.o. Fifty-one.
St. 76. N. 100. 1500 m. 1800 m.w.o. Forty-two.
St. 76. N. 200. 2500 m. 2800 m.w.o. Twelve.
St. 95. N. 200. 430–984 m. 1400 m.w.o. One hundred and two.
St. 96. N. 200. 400–645 m. 900 m.w.o. Fifty-three.
St. 98. N. 200. 2800–0 m. 2800 m.w.o. Four.
St. 131 D. N. 100. 500–0 m. Five.
St. 131 D. N. 100. 1500–0 m. Seven.
St. 131 D. N. 200. 2500–0 m. One.
St. 145 C. N. 100. 300–0 m. Fifteen.
St. 145 D. N. 100. 50–0 m. One.
St. 145 D. N. 100. 100–0 m. Five.
St. 145 D. N. 100. 300–0 m. Three.
St. 145 D. N. 100. 400–0 m. Three.
St. 172. N. 100. 200–0 m. 510 m.w.o. Twenty-eight.
St. 172. N. 100. 400–0 m. 820 m.w.o. One hundred and eighty-eight.
St. 172. N. 100. 850–0 m. 1500 m.w.o. One hundred and fifty-nine.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. Four.
St. 186. N. 100. 575–0 m. 880 m.w.o. Two hundred and seventeen.
St. 186. N. 100. 600–0 m. 1150 m.w.o. Forty-one.

Remarks.—This species and *E. distinguenda* are the two most characteristic species of *Euphausia* in the area explored by the John Murray Expedition. No very definite conclusions can be drawn from the above records as to the bathymetrical distribution of the species. They suggest that the region of greatest abundance lies between 500 and 1500 metres, and that in water of greater depth it is relatively scarce. At St. 61, where comparable day and night series of tow-nettings were taken, there is also an indication of migration towards the surface at night. At this station fifteen immature specimens were actually caught in the night surface tow-netting. On the other hand, Hansen records the species at a number of stations in the Eastern Pacific in some numbers at the surface, and, commenting on material in the Copenhagen Museum, says that most of it was taken at the surface. Unfortunately the time of day at which the gatherings were made is not given and it is impossible to say whether the species is normally found at or near the surface in the Eastern Pacific or migrates there with the approach of darkness.

Euphausia tenera Hansen.

Euphausia tenera, Hansen, 1905 (2), 1910, 1911 and 1912; Illig, 1930.
Euphausia gracilis, G. O. Sars, 1885.

Occurrence:

St. 96. N. 200. 400–645 m. 900 m.w.o. Two.
St. 131 D. N. 100. 500–0 m. Thirty.
St. 131 D. N. 100. 1500–0 m. Twenty-seven.
St. 145 C. N. 100. 300–0 m. Seventeen.
St. 145 D. N. 100. 50–0 m. One.
St. 145 D. N. 100. 100–0 m. Eight.
St. 145. D. N. 100. 300–0 m. Three.
St. 145 D. N. 100. 400–0 m. Eight.
St. 172. N. 100. 400–0 m. 820 m.w.o. Fourteen.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Eight.

Euphausia similis G. O. Sars.

Euphausia similis, G. O. Sars, 1885; Hansen, 1911; Illig, 1930.

Occurrence:

St. 98. N. 200. 2800–0 m. One male.
St. 131 A. N. 200. 600–0 m. One male and one female.
St. 131 D. N. 100. 500–0 m. One male and one immature.
St. 131 D. N. 100. 1500–0 m. One female.
St. 131 D. N. 200. 2500–0 m. One male and one female.
St. 172. N. 100. 850–0 m. 1500 m.w.o. One male.

Remarks.—All these specimens appear to be the normal form, without abdominal spine and with a long, sharply-pointed rostrum.

Euphausia paragibba Hansen.

Euphausia paragibba, Hansen, 1910, 1911 and 1912; Tattersall, 1911 (2); Illig, 1930.

Occurrence:

St. 96. N. 200. 400–645 m. 900 m.w.o. Two.
St. 131 D. N. 100. 1500–0 m. Nine.
St. 131 D. N. 200. 2500–0 m. One.
St. 172. N. 100. 400–0 m. 820 m.w.o. Fifteen.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Five.

Euphausia pseudogibba Ortmann.

Euphausia pseudogibba, Ortmann, 1893; Hansen, 1905 (1), 1910, 1911 and 1912; Illig, 1930.

Occurrence:

St. 145 C. N. 100. 300–0 m. One, parasitized by *Heterophryxus appendiculatus*.
St. 145 D. N. 100. 100–0 m. One.
St. 145 D. N. 100. 300–0 m. One.
St. 145 D. N. 100. 400–0 m. Four.

Euphausia gibboides Ortmann.

Euphausia gibboides, Ortmann, 1893; Hansen, 1905 (1), 1911 and 1912; Tattersall, 1925; Illig, 1930.

? Euphausia sanzoi, Torelli, 1934 (1).

Occurrence:

St. 5. N. 200. 500–0 m. 900 m.w.o. Six females.

Remarks.—These specimens must, I think, belong to the species named *E. sanzoi* by Torelli (1934 (1)) from specimens captured in the Red Sea, the locality of the present specimens. Unfortunately there are no males in the material, so that I cannot be sure on this point. At the same time I am of the opinion that the institution of *E. sanzoi* as a separate species is open to question. The differences between it and *E. gibboides* are almost all confined to the copulatory organs on the first pleopod of the male. In recording *E. gibboides* from off the coast of Natal (1925), I noted that the specimens differed from *E. gibboides* as described and figured by Hansen (1912) in having two protruding triangular acute tubercles on the median lobe of the male copulatory organs instead of one, and in having the tip of the terminal process bifid instead of simple. Torelli found these differences to hold for specimens from the Red Sea, and considered them of sufficient magnitude to warrant the formation of a new species, which she named *E. sanzoi*. Females can hardly be distinguished from those of *E. gibboides* and, in the absence of males, I refer the present specimens to *E. gibboides* rather than to *E. sanzoi*.

Euphausia distinguenda Hansen.

Euphausia distinguenda, Hansen, 1911 and 1912; Illig, 1930; Torelli, 1934 (1).

Occurrence:

St. 61 A–B. N. 100. 500–0 m. 570 m.w.o. Thirty-eight.
St. 61 A–B. N. 100. 1000–0 m. 1136 m.w.o. Forty-six.
St. 61 A–B. N. 100. 1500–0 m. 1702 m.w.o. Four hundred and eighty-six.
St. 61 C–D. N.S. 50. Surface. One hundred and thirty-four.
St. 61 C–D. N. 100. 500–0 m. 570 m.w.o. Seven.
St. 61 C–D. N. 100. 1000–0 m. 1136 m.w.o. Three hundred and seventy-eight.
St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. Two hundred and eighty-two.
St. 61 C–D. N. 200. 2000–0 m. 2265 m.w.o. Two.
St. 76. N. 100. 200 m. 300 m.w.o. One hundred and six.
St. 76. N. 100. 600 m. 800 m.w.o. Three hundred and forty-seven.
St. 76. N. 100. 1500–0 m. 1800 m.w.o. One hundred and forty-eight.
St. 76. N. 200. 2500 m. 2800 m.w.o. One.
St. 96. N. 200. 400–645 m. 900 m.w.o. Two hundred and fifteen.
St. 131 D. N. 100. 1500–0 m. One.
St. 145 C. N. 100. 400–0 m. Two.
St. 172. N. 100. 200–0 m. 510 m.w.o. Thirty.
St. 172. N. 100. 400–0 m. 820 m.w.o. Eighty-nine.
St. 172. N. 100. 850–0 m. 1500 m.w.o. One hundred and one.
St. 186. N. 100. 250–0 m. 510 m.w.o. One.
St. 186. N. 100. 575–0 m. 880 m.w.o. Two hundred and twenty-nine.
St. 186. N. 100. 600–0 m. 1150 m.w.o. Twenty-seven.

Remarks.—This species is the most abundant species of *Euphausia* in the collection and one of the most characteristic species of the Indian Ocean. It would appear to have a bathymetrical distribution somewhat similar to that of *E. diomedeae*. The records at St. 61 are rather interesting, and suggest more clearly than was the case in *E. diomedeae* a vertical movement towards the surface during the hours of darkness. Over one hundred specimens were caught actually at the surface at night. The records at St. 61 are tabulated below :

	Day.	Night.
0 m.	8	134
500–0 m.	38	7
1000–0 m.	46	378
1500–0 m.	486	282
2000–0 m.	0	2

Hansen (1912) remarks that in the Eastern Pacific this species is often taken at the surface, but that the majority of the specimens so taken were immature or larval. There is, however, no time given at which the specimens were captured.

Genus *Pseudeuphausia* Hansen.

Pseudeuphasia latifrons (G. O. Sars).

Euphausia latifrons, G. O. Sars, 1885 ; Hansen, 1908.
Pseudeuphausia latifrons, Hansen, 1910, 1911 and 1912 ; Illig, 1930 ; Torelli, 1934 (1).

Occurrence :

St. 61 A. N.S. 50. Surface. One.
St. 61 C. N.S. 50. Surface. One hundred and twenty.
St. 61 D. N. 100. 1000–0 m. 1136 m.w.o. Three.

Remarks.—The striking difference between the day and night surface tow-nettings at St. 61 is interesting and suggests a migration towards the surface during hours of darkness. Unfortunately, however, there is no material of this species in the deeper hauls which would suggest at what level the species is most abundant during the daytime. It is probably entirely a species of the upper waters, and does not descend to any great depth during the day.

Genus *Nematoscelis* G. O. Sars.

Nematoscelis microps G. O. Sars.

Nematoscelis microps, G. O. Sars, 1885 ; Hansen, 1908, 1910, 1911 and 1912 ; Illig, 1930.
Nematoscelis rostrata, Ortmann, 1893.

Occurrence :

St. 172. N. 100. 400–0 m. 820 m.w.o. Eight.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Three.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. Two.

Nematoscelis gracilis Hansen.

Nematoscelis gracilis, Hansen, 1910, 1911 and 1912 ; Tattersall, 1911 (2) ; Illig, 1930 ; Torelli, 1934 (1).

Occurrence :

St. 18. N. 200. 900–0 m. 1500 m.w.o. One.
St. 25. Agassiz trawl. 620 m. One.
St. 76. N. 100. 600–0 m. 800 m.w.o. Two.
St. 95. N. 200. 430–984 m. 1400 m.w.o. Fourteen.
St. 96. N. 200. 400–645 m. 900 m.w.o. Three hundred and ninety-two.
St. 98. N. 200. 2800–0 m. Two.
St. 131 A. N. 200. 600–0 m. Seven.
St. 131 D. N. 100. 500–0 m. Four.
St. 131 D. N. 100. 1500–0 m. Thirteen.
St. 131 D. N. 200. 2500–0 m. Four.
St. 145 C. N. 100. 300–0 m. One.
St. 145 C. N. 100. 400–0 m. Seven.
St. 145 D. N. 100. 100–0 m. One.
St. 145 D. N. 100. 300–0 m. Three.
St. 145 D. N. 100. 400–0 m. Nine.
St. 172. N. 100. 200–0 m. 510 m.w.o. Nine.
St. 172. N. 100. 400–0 m. 820 m.w.o. Three hundred and fifty-nine.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Four hundred and twenty-eight.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. Twenty-seven.
St. 185. Agassiz trawl. 2000 m. One.
St. 186. N. 100. 250–0 m. 510 m.w.o. One.
St. 186. N. 100. 575–0 m. 880 m.w.o. Thirty-seven.
St. 186. N. 100. 600–0 m. 1150 m.w.o. Fifty-two.
St. 186. N. 200. 952–0 m. 1500 m.w.o. Five.

Remarks.—This species of *Nematoscelis* is very abundant in the Indian Ocean area and one of the characteristic species of the waters investigated. There is some evidence from the series of tow-nettings taken at St. 172 and St. 186 that the species is more abundant between 400 and 1000 metres than in the waters above and below that zone. On the other hand there is no suggestion that the species migrates towards the surface at night.

Nematoscelis tenella G. O. Sars.

Nematoscelis tenella, G. O. Sars, 1885 ; Hansen, 1905 (2), 1910, 1911 and 1912 ; Illig, 1930.
Nematoscelis mantis, Chun, 1896.
Nematoscelis sarsii, Chun, 1896.

Occurrence :

St. 18. N. 200. 900–0 m. 1500 m.w.o. One.
St. 96. N. 200. 400–645 m. 900 m.w.o. Eight.
St. 98. N. 200. 2800–0 m. One.
St. 121. Agassiz trawl. One.
St. 131 A. N. 200. 600–0 m. Six.
St. 131 D. N. 200. 2500–0 m. Four.
St. 145 C. N. 100. 400–0 m. Two.
St. 172. N. 100. 200–0 m. 510 m.w.o. Two.
St. 172. N. 100. 400–0 m. 820 m.w.o. Twenty-five.

St. 172. N. 100. 850–0 m. 1500 m.w.o. Nineteen.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. Nine.
St. 186. N. 100. 575–0 m. 880 m.w.o. Eight.
St. 186. N. 100. 600–0 m. 1150 m.w.o. Two.
St. 186. N. 200. 952–0 m. 1500 m.w.o. One.

Genus *Nematobrachion* Calman.

Nematobrachion boöpis (Calman).

Nematodactylus boöpis, Calman, 1896.
Nematobrachion boöpis, Calman, 1905 ; Hansen, 1905 (1) and (2), 1910, 1911 and 1912 ; Illig, 1930.

Occurrence :

St. 96. N. 200. 400–645 m. 900 m.w.o. Fourteen.
St. 131 A. N. 200. 600–0 m. One.
St. 131 D. N. 100. 500–0 m. One.
St. 131 D. N. 100. 1500–0 m. One.
St. 131 D. N. 200. 2500–0 m. Two.
St. 145 D. N. 100. 500–0 m. One.

Nematobrachion flexipes (Ortmann).

Stylocheiron flexipes, Ortmann, 1893.
Nematobrachion flexipes, Hansen, 1905 (2), 1910, 1911 and 1912 ; Illig, 1930.

Occurrence :

St. 18. N. 200. 900–0 m. 1500 m.w.o. One.
St. 25. Agassiz trawl. 620 m. Four.
St. 76. N. 100. 600 m. 800 m.w.o. Two.
St. 76. N. 100. 1500 m. 1800 m.w.o. Four.
St. 76. N. 200. 2500 m. 2800 m.w.o. Two.
St. 95. N. 200. 430–984 m. 1400 m.w.o. Eight.
St. 96. N. 200. 400–645 m. 900 m.w.o. Seven.
St. 98. N. 200. 2800–0 m. Two.
St. 172. N. 100. 200–0 m. 510 m.w.o. One.
St. 172. N. 100. 400–0 m. 820 m.w.o. Two.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. One.
St. 186. N. 100. 575–0 m. 880 m.w.o. Four.
St. 186. N. 100. 600–0 m. 1150 m.w.o. One.
St. 186. N. 200. 952–0 m. 1500 m.w.o. Two.

Remarks.—All these specimens have a well-developed spine on the lower margin of the carapace. The spine on the posterior dorsal median border of the third abdominal somite is sometimes excessively developed and may be more than half the length of the fourth abdominal somite.

Genus *Stylocheiron* G. O. Sars.

Stylocheiron carinatum G. O. Sars.

Stylocheiron carinatum, G. O. Sars, 1885 ; Hansen, 1910, 1911 and 1912 ; Illig, 1930.

Occurrence :

St. 96. N. 200. 400–645 m. 900 m.w.o. Four.
St. 131 D. N. 100. 500–0 m. Six.
St. 131 D. N. 100. 1500–0 m. Three.
St. 145 D. N. 100. 50–0 m. Three.
St. 145 D. N. 100. 100–0 m. Four.
St. 145 D. N. 100. 300–0 m. Five.
St. 145 D. N. 100. 400–0 m. Nineteen.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Two.

Remarks.—Female specimens from St. 131 were carrying eggs, indicating the early early spring as the breeding season in the Indian Ocean.

Stylocheiron affine Hansen.

Stylocheiron affine, Hansen, 1910, 1911 and 1912 ; Illig, 1930.

Occurrence :

St. 61 A–B. N. 100. 500–0 m. 570 m.w.o. One.
St. 61 A–B. N. 100. 1000–0 m. 1136 m.w.o. One.
St. 61 C–D. N. 100. 500–0 m. 570 m.w.o. Two.
St. 61 C–D. N. 100. 1000–0 m. 1136 m.w.o. Ten.
St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. One.
St. 61 C–D. N. 200. 2000–0 m. 2265 m.w.o. One.
St. 76. N. 100. 200–0 m. 300 m.w.o. One.
St. 76. N. 100. 600–0 m. 800 m.w.o. Three.
St. 76. N. 100. 1500–0 m. 1800 m.w.o. Three.
St. 96. N. 200. 400–645 m. 900 m.w.o. Three.
St. 131 D. N. 100. 500–0 m. Seven.
St. 131 D. N. 100. 1500–0 m. One.
St. 145 D. N. 100. 100–0 m. One.
St. 145 D. N. 100. 500–0 m. Two.
St. 172. N. 100. 200–0 m. 510 m.w.o. Two.
St. 172. N. 100. 400–0 m. 820 m.w.o. Nineteen.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Eleven.
St. 186. N. 100. 250–0 m. 510 m.w.o. Three.
St. 186. N. 100. 575–0 m. 880 m.w.o. Three.
St. 186. N. 100. 600–0 m. 1150 m.w.o. Six.

Stylocheiron longicorne G. O. Sars.

Stylocheiron longicorne, G. O. Sars, 1885 ; Hansen, 1910, 1911 and 1912 ; Illig, 1930.

Occurrence :

St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. One.
St. 76. N. 100. 200 m. 300 m.w.o. Twelve.
St. 76. N. 100. 600 m. 800 m.w.o. Sixteen.
St. 76. N. 100. 1500 m. 1800 m.w.o. Five.
St. 96. N. 200. 400–645 m. 900 m.w.o. Six.
St. 131 D. N. 100. 500–0 m. One.
St. 131 D. N. 100. 1500–0 m. Two.

St. 145 D. N. 100. 100–0 m. One.
St. 145 D. N. 100. 300–0 m. Two.
St. 172. N. 100. 200–0 m. 510 m.w.o. Twenty-five.
St. 172. N. 100. 400–0 m. 820 m.w.o. Twenty.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Eleven.
St. 186. N. 100. 250–0 m. 510 m.w.o. Ten.
St. 186. N. 100. 575–0 m. 880 m.w.o. Nine.
St. 186. N. 100. 600–0 m. 1150 m.w.o. Six.
St. 186. N. 200. 952–0 m. 1500 m.w.o. One.

Stylocheiron elongatum G. O. Sars.

Stylocheiron elongatum, G. O. Sars, 1885; Hansen, 1910, 1911 and 1912; Illig, 1930.

Occurrence:

St. 96. N. 200. 400–645 m. 900 m.w.o. One.
St. 131 D. N. 100. 500–0 m. One.
St. 172. N. 100. 200–0 m. 510 m.w.o. Three.
St. 172. N. 100. 400–0 m. 820 m.w.o. One.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Two.

Stylocheiron maximum Hansen.

Stylocheiron maximum, Hansen, 1910, 1911 and 1912; Illig, 1930.

Occurrence:

St. 95. N. 200. 430–984 m. 1400 m.w.o. One.
St. 96. N. 200. 400–645 m. 900 m.w.o. Five.
St. 120. Agassiz trawl. 2926 m. One.
St. 172. N. 100. 200–0 m. 510 m.w.o. Four.
St. 172. N. 100. 400–0 m. 820 m.w.o. Seven.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Two.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. One.
St. 186. N. 100. 250–0 m. 510 m.w.o. One.
St. 186. N. 100. 575–0 m. 880 m.w.o. One.
St. 186. N. 200. 952–0 m. 1500 m.w.o. Three.

Stylocheiron abbreviatum G. O. Sars.

Stylocheiron abbreviatum, G. O. Sars, 1885; Hansen, 1905 (1), 1910, 1911 and 1912; Illig, 1930.
Stylocheiron chelifer, Chun, 1896.

Occurrence:

St. 5. N. 200. 500–0 m. 900 m.w.o. Three.
St. 96. N. 200. 400–645 m. 900 m.w.o. Two.
St. 131 D. N. 100. 500–0 m. Two.
St. 131 D. N. 100. 1500–0 m. One.
St. 145 D. N. 100. 100–0 m. One.
St. 145 D. N. 100. 400–0 m. One.
St. 172. N. 100. 200–0 m. 510 m.w.o. One.
St. 172. N. 100. 400–0 m. 820 m.w.o. Three.
St. 172. N. 100. 850–0 m. 1500 m.w.o. Three.

MYSIDACEA.

Sub-order LOPHOGASTRIDA.

Family Lophogastridae.

Genus *Lophogaster* M. Sars.

Lophogaster rotundatus Illig.

Lophogaster rotundatus, Illig, 1930.
Lophogaster typicus, var., Tattersall, 1911 (2).

Occurrence :

St. 104. Grab. 207 m. One, 21 mm.
St. 105. Grab. 280 m. Two, 21–22 mm.

Remarks.—Both specimens are somewhat damaged, but agree with Illig's description in the two fundamental characters of the species, namely, (1) the rounded postero-lateral corners of the carapace, and (2) the absence of coarse granules on the carapace. There is one point of difference from Illig's description. The median rostral spine is equal in length to the two lateral spines, and the whole rostral plate does not cover the antennular peduncles, but leaves the distal joint exposed. In Illig's drawing the central rostral spine is shown as longer than the lateral and extending to the distal end of the antennular peduncle. This character is, however, subject to considerable variation in other species of the genus (Ortmann, 1906). There are three teeth on the outer margin of the antennal scale in addition to the terminal tooth. The telson is damaged in all three specimens, but in a fragment of another specimen it is better preserved and shows only one spine on each side of the large apical spines, whereas Illig figures two in his specimen. The specimen which I recorded (1911 (2)) from the Saya de Malha Bank as *L. typicus* var. proves, on re-examination, to belong to this species. It has, however, five teeth on the outer margin of the antennal scale in addition to the terminal one.

Distribution.—Illig's material was taken in the Zanzibar Channel, in virtually the same locality as the present specimens. Apart from the earlier record from the Saya de Malha Bank no other specimens are known.

Genus *Gnathophausia* W.-Suhm.

Gnathophausia ingens (Dohrn).

Gnathophausia ingens, G. O. Sars, 1885 ; Ortmann, 1906 ; Hansen, 1912 ; Hansen, 1927 ; Illig, 1930.
Gnathophausia calcarata, G. O. Sars, 1885 ; Ortmann, 1906 ; Tattersall, 1911 (2).
Gnathophausia bengalensis, Wood-Mason and Alcock, 1891 (2).
Gnathophausia doryophora, Illig, 1930.
Gnathophausia goliath, A. Milne-Edwards. (Folin, 1887 ; Perrier, 1886 and 1891 ; Stebbing, 1893.)

Occurrence :

St. 98. N. 200. 2800–0 m. One, 27 mm.
St. 121. Agassiz trawl. Seven, 24–42 mm.
St. 170. Agassiz trawl. 3676 m. One, 40 mm.

Remarks.—The specimens were measured from the level of the eye to the end of the telson. They are all small, and serve to confirm Hansen's conclusion (1927) that *G. doryophora* was founded on a small specimen of *G. ingens*.

The elaborate synonymy of the species is the result of the work of Ortmann (1906) and Hansen (1912 and 1927). Ortmann united *G. bengalensis* with *G. calcarata* and suggested that both were young stages of *G. ingens*. Hansen confirmed these conclusions and later added *G. doryophora* Illig to the synonymy. Another name which has found its way into literature appears to refer to this species. Stebbing (1893, p. 29) mentions a species under the name of *Gnathophausia goliath* A. M.-Edw. The same species is referred to in the popular books of Folin (1887) and Perrier (1886 and 1891). I have been unable to trace the original paper in which the species was named, but, from a consideration of the works referred to, I believe the name was used for the gigantic specimen of *G. ingens*, measuring 210 mm., captured by the "Talisman" Expedition to the south of the Azores, and recorded by Hansen (1927) in his report on the Sergestidae and Schizopoda of that expedition.

Distribution.—Earlier records of this species from the Indian Ocean are given by Wood-Mason and Alcock (1891 (2)), Tattersall (1911 (2)), and Illig (1906 (2) and 1930). It is widely distributed in the tropical and sub-tropical oceans of the world.

Gnathophausia gigas W.-Suhm.

Gnathophausia gigas, W. Suhm, 1875 ; Sars, 1885 ; Ortmann, 1906 ; Hansen, 1927.
Gnathophausia drepanophora, Holt and Tattersall, 1905 (1) ; Illig, 1930.

Occurrence :

St. 61 B. N. 100. 1500–0 m. 1702 m.w.o. One, 26 mm.

Remarks.—The single specimen measured 26 mm. from the eye to the end of the telson. The rostral spine measured 7 mm., and was thus about one-quarter of the total length of the animal. The carapace from the tip of the rostral spine to the end of the posterior dorsal spine measured 16 mm., and the postero-lateral spine of the carapace measured 3 mm. in length and extended backwards as far as the posterior margin of the second abdominal somite. There were two teeth on the outer margin of the antennal scale in addition to the terminal one.

Distribution.—I can trace no earlier records of this species from the Indian Ocean. It has, however, a wide distribution in the oceans of the world, and appears to extend its range much more into the temperate zones, both in the north and south hemispheres, than does *G. ingens*. It is known from as far north as 57° lat. (Stephensen, 1933) and as far south as 48° lat. (Tattersall, 1913), both stations in the Atlantic, and from the Behring Sea in the Pacific (Ortmann, 1906).

Gnathophausia gracilis W.-Suhm.

Gnathophausia gracilis, W.-Suhm, 1875 ; G. O. Sars, 1885 ; Ortmann, 1906 ; Hansen, 1912 ; Illig, 1930.
Gnathophausia gracilis var. *brevispinis*, Wood-Mason and Alcock, 1891 (1).
Gnathophausia brevispinis, Wood-Mason and Alcock, 1891 (2) ; Anderson, 1897 ; Faxon, 1895.
Gnathophausia dentata, Faxon, 1893.
Gnathophausia bidentata, Illig, 1906 (2).
Gnathophausia sp., Chun, 1900, coloured plate opposite p. 500.

Occurrence :

St. 61 D. N. 200. 2000–0 m. 2265 m.w.o. Three, 30–70 mm., and four damaged young specimens.
St. 76. N. 200. 2500–0 m. 2800 m.w.o. Four, 22–78 mm.
St. 85. Monegasque trawl. 1519–1705 m. One, 40 mm.

Remarks.—These specimens agree with Ortmann's description rather than with that of Sars, but, as Ortmann points out, the "Challenger" specimen was in a poor state of preservation. The pleural processes of the abdominal somites become relatively more expanded posteriorly in large specimens. The lower posterior spine of the carapace varies with age. It is well developed in the small specimen of 22 mm., but obsolete in the largest specimen. In a specimen of 40 mm. it is present on one side and absent on the other.

Distribution.—Previously recorded from the Indian Ocean by Wood-Mason and Alcock (1891 (1) and (2)), and from the Arabian Sea by Anderson (1897). It is widely distributed in the deeper waters of the tropical oceans of the world.

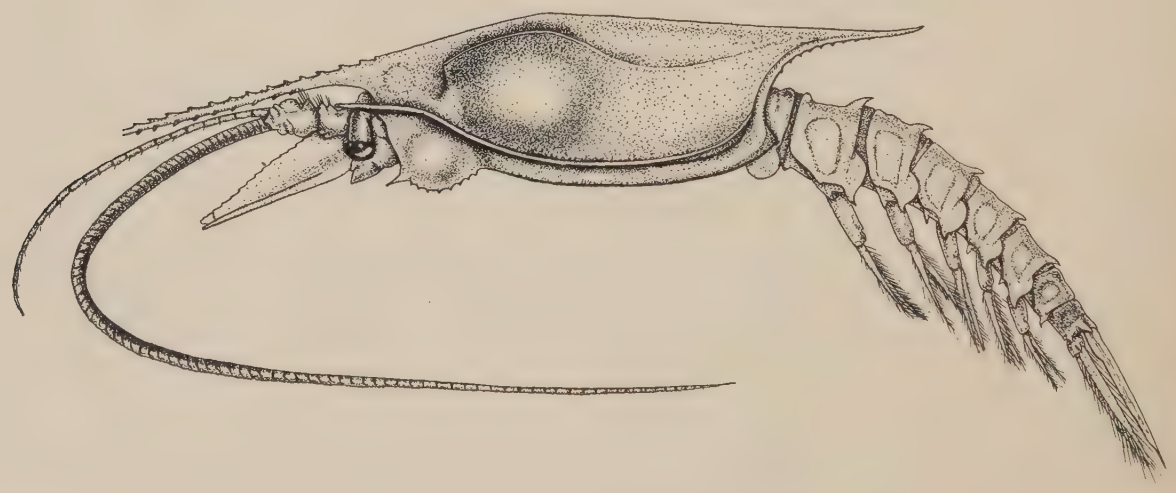
Gnathophausia zoea W.-Suhm, var. *scapularis* Ortmann. Text-figs. 1, 2.

Gnathophausia scapularis, Ortmann, 1906.

Occurrence :

St. 61 A–B. N. 100. 1500–0 m. 1702 m.w.o. One, 33 mm.
St. 61 A–B. N. 200. 2000–0 m. 2265 m.w.o. One, 18 mm.
St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. Two, 12–25 mm.
St. 61 C–D. N. 200. 2000–0. m. 2265 m.w.o. Four, 22–60 mm.
St. 76. N. 200. 2500–0 m. 2800 m.w.o. One, 66 mm.
St. 85. Monegasque trawl. 1519–1705 m. One, 55 mm.

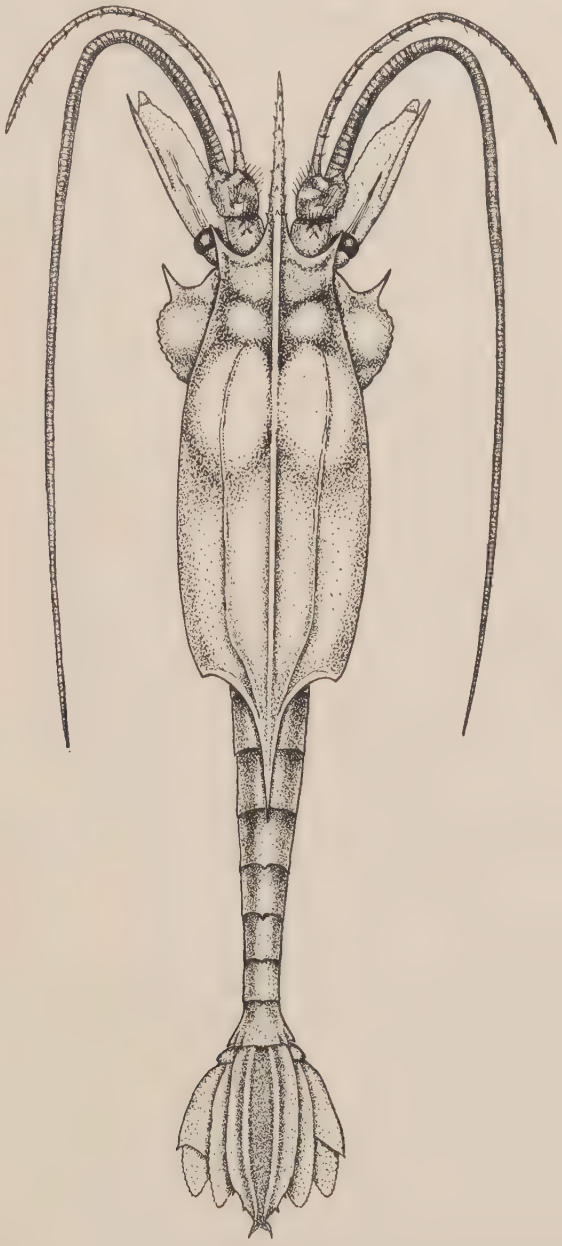
Remarks.—Ortmann (1906) described a new species of *Gnathophausia*, *G. scapularis*, as "near *G. zoea*, but easily recognized by the anterior constriction of the carapace and the greatly expanded branchiostegal lobes". The specimens in this collection conform to



Text-fig. 1.—*Gnathophausia zoea* W.-Suhm, var. *scapularis* Ortm. Lateral view. × 2.

that description. I have compared them with typical specimens of *G. zoea*, and find that the apparent constriction of the carapace towards the anterior end is due to an unusual inflation of the carapace on each side immediately behind the branchiostegal lobes, producing a prominent lateral bulge (Text-fig. 1). This has the effect, as seen in lateral view (compare Ortmann, 1906, fig. 3*a*), of causing the dorso-lateral keels to slope downwards as they run posteriorly, instead of being parallel to the median dorsal keel as shown by Sars (1885, pl. vi, fig. 6). It has the further effect, also noted by Ortmann (fig. 3*c*), of making the anterior part of the carapace between the dorso-lateral keels almost flat and

horizontal, instead of sloping gradually down to the lateral portions of the carapace. The result is that the general appearance of the specimens is markedly different from that of typical specimens of *G. zoea*. In the details of their morphology and appendages,



TEXT-FIG. 2.—*Gnathophausia zoea* W.-Suhm, var. *scapularis* Ortm. Dorsal view. × 2.

however, the two forms are practically identical, as Ortmann himself pointed out. I do not think that the peculiar conformation of the carapace can be regarded as anything more than a varietal character, and it is in that light that I have viewed it here, reducing the species to varietal rank.

DISTRIBUTION.—*G. scapularis* was originally recorded from off Lower California in 460 fathoms. No other specimens have been noted. Great interest, therefore, attaches to the discovery of this variety in the deep water of the Indian Ocean.

Gnathophausia elegans G. O. Sars.

Gnathophausia elegans, G. O. Sars, 1885; Ortmann, 1906; Hansen, 1910.

Occurrence:

St. 158. Agassiz trawl. 786–1170 m. One, 50 mm.

Remarks.—This specimen agrees with Sars' description rather than with that of Ortmann in that the branchiostegal spine is rounded, and the abdominal somites do not appear to have depressed angular projections.

Distribution.—This is one of the rarest species of the genus. It is known only from the Pacific Ocean, off Japan, South of Fiji and in the area explored by the Siboga Expedition. It has not been found previously in the Indian Ocean.

Family Eucopiidae.

Genus *Eucopia* Dana.

Eucopia sculpticauda Faxon.

Eucopia sculpticauda, Faxon, 1895; Anderson, 1897; Hansen, 1910 and 1912; Tattersall, 1911 (2); Illig, 1930.
Eucopia intermedia, Hansen, 1905 (1).

Occurrence:

St. 98. N. 200. 2800–0 m. Two, 21–28 mm.
St. 120. Agassiz trawl. 2926 m. One, 39 mm.
St. 170. Agassiz trawl. 3676 m. One, 28 mm.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. Three, 26–38 mm.

Distribution.—Previously recorded from the Bay of Bengal (Anderson, 1897) and the Indian Ocean, near to the Seychelles (Tattersall, 1911). It has a wide distribution in the deeper waters of the world, mainly in tropical and temperate regions, but has been recorded as far north as off the East coast of Greenland (Stephenson, 1933).

Eucopia unguiculata W.-Suhm.

Eucopia unguiculata, Hansen, 1910 and 1912; Tattersall, 1911 (2); Illig, 1930.
? Eucopia australis, Wood-Mason and Alcock, 1891 (2); Anderson, 1897.

Occurrence:

St. 61 A–B. N. 100. 1500–0 m. 1702 m.w.o. One.
St. 95. N. 200. 430–984 m. 1400 m.w.o. Nine.
St. 96. N. 200. 400–645 m. 900 m.w.o. One.
St. 98. N. 200. 2800–0 m. Four.
St. 131 D. N. 100. 1500–0 m. One.
St. 131 D. N. 200. 2500–0 m. Two.
St. 162. Agassiz trawl. 1829–2051 m. One.
St. 172. N. 100. 850–0 m. 1500 m.w.o. One.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. Twenty-two.

Remarks.—Previous records from the area of the Murray Expedition are given by Tattersall (1911 (2)) and Illig (1930). I think the record of *E. australis* from the Arabian Sea (Anderson, 1897), and also those from the Bay of Bengal (Wood-Mason and Alcock, 1891 (2)) probably refer to this species or to *E. major*.

Eucopia major Hansen.

Eucopia major, Hansen, 1910 and 1912; Zimmer, 1914; Illig, 1930.

Occurrence:

St. 61 D. N. 100. 1500–0 m. 1702 m.w.o. Two.

Distribution.—This species has not previously been recorded from the Indian Ocean. It is known both from the Atlantic and Pacific Oceans, at moderately great depths.

Sub-order MYSIDA.

Family Petalophthalmidae.

Genus *Petalophthalmus* W.-Suhm.

Petalophthalmus armiger W.-Suhm.

Petalophthalmus armiger, W.-Suhm, 1875; G. O. Sars, 1885; Alcock and Anderson, 1894; Tattersall, 1925.

Occurrence:

St. 184. Agassiz trawl. 1270 m. One female, 30 mm., and one male, 28 mm.

Remarks.—Both specimens showed well-developed flagella, consisting of seven or eight joints, on the antennal peduncles. The specimens are not in very good condition, but agree, as far as I can see, very well with the specimen described by me in 1925.

Distribution.—The only previous record from the Indian Ocean is by Alcock and Anderson (1894), who recorded this species from the Laccadive Sea. It is a deep-water form widely distributed in the Atlantic and Pacific Oceans, but apparently very rare.

Petalophthalmus oculatus Illig. Text-fig. 3.

Petalophthalmus oculatus, Illig, 1906 (1) and 1930; Tattersall, 1937.

Occurrence:

St. 131 D. N. 100. 1500–0 m. One young specimen, 7 mm.

Remarks.—This remarkable and interesting species was described by Illig from specimens captured off Aden. His specimens measured 14–16 mm. in length, and, according to his figure of the female, were adult. The species differs from the type mainly in the possession of well-developed eyes, yellow-brown in colour, in which facets were observed in a well-developed cornea. The other most noticeable difference is to be found in the telson, which is relatively much shorter than in *P. armiger* and extends only to the distal end of the proximal joint of the outer uropod. Its apical armature is also distinctive, four long setæ being found among the spines arming the apex.

The specimen here recorded is a very small and apparently juvenile example, and it is not in very good condition. I have been led to refer it to this species mainly by the form of the telson and its armature. The eyes are not in good preservation, but show one point of difference from Illig's description in that they have a small finger-shaped process on the inner side.

The telson (Text-fig. 3) has the form and proportions shown by Illig. There are, however, only three spines on each lateral margin, whereas in Illig's specimens the number of lateral spines was seventeen. On the other hand the apex of the telson in the present

specimen has more spines and setæ than Illig shows. Illig figures thirteen spines and four long delicate setæ, whereas in this specimen there are twenty-five spines, among which six long setæ are to be found. I think these differences may be explained as due to immaturity, the spines on the lateral margins increasing in number with age, while those at the apex suffer reduction. One other point of difference may be noted. The terminal joint of the mandibular palp is only about one-quarter of the length of the preceding joints, and has three long terminal setæ and three setæ on the lower margin, but none on the upper. In spite of the differences I believe the specimen to be referable to Illig's species. The points of agreement are many and striking.

Text-fig. 3.—*Petalophthalmus oculatus* Illig. Telson and right uropods. × 50.

Distribution.—The distribution of this species is rather remarkable. Illig's specimens were found in the Indian Ocean, near to Aden, and the present specimens rather further south, to the N.E. of the Seychelles. I have recently recorded it from very deep water in the Caribbean Sea (1937). It is not known from any other locality.

Family Mysidae.

Sub-family Boreomysinae.

Genus *Boreomysis* G. O. Sars.

Boreomysis microps G. O. Sars. Text-fig. 4.

Boreomysis microps, G. O. Sars, 1885; Holt and Tattersall, 1905 and 1906; Tattersall, 1911 (1).
Boreomysis subpellucida, Hansen, 1905 (1)

Occurrence:

St. 96. N. 200. 400–645 m. 900 m.w.o. One female, 10 mm.
St. 172. N. 100. 850–0 m. 1500 m.w.o. One female, 14 mm.
St. 172. N. 200. 2091–0 m. 2665 m.w.o. Two females, 14–17 mm.

Remarks.—This species can be recognized readily by the curious subchelate formation of the endopod of the second thoracic limb, to which I directed attention in 1911 (1). I give a figure of this limb from one of the Murray specimens (Text-fig. 4). It should be

Text-fig. 4.—*Boreomysis microps* G. O. Sars. Second thoracic limb. × 38.

compared with the corresponding limb in *B. verrucosa* (Text-fig. 8), where it is of more usual form.

Distribution.—This species has not been recorded previously from the Indian Ocean. It is widely distributed in the deep water of the tropical, sub-tropical and temperate regions of the Atlantic Ocean.

Boreomysis spinifera Coifmann.

Boreomysis spinifera, Coifmann, 1936.

Occurrence :

St. 18. N. 200. 900–0 m. 1500 m.w.o. One adult male and one adult female, 13 mm.

St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. One adult female, 14 mm.

Remarks.—This species has recently been defined by Coifmann (1936) from specimens captured in the Gulf of Aden. It is remarkably close to *B. sibogae* Hansen, but differs, according to Coifmann, in the form and dimensions of the telson, the form of the ocular papilla, and by the presence of two spines on the inner margin of the inner uropod. No significance can be attached to the last of these differences. Hansen does not mention the spines on the uropod, but may simply have overlooked them. The most conspicuous difference is that of the telson. In Coifmann's figure each lobe of the apex of the telson is armed with one large spine, conspicuously larger than the spines on either side of it, whereas in Hansen's figure there is no such conspicuous spine, and the apical lobes appear, in consequence, more rounded than in Coifmann's figure. The present material agrees in this respect with Coifmann's figure, and I, therefore, refer it to her species. I am, however, doubtful whether such a small difference can be regarded as of specific value, in view of the otherwise close resemblance between the two forms. Both species differ from the other species of the genus in the relative great length of the proximal unarmed portion of the outer margin of the outer uropod, and can be readily recognized by this character and by the form of the rostral plate. It may well be that further material will show that the two species are synonymous.

Boreomysis verrucosa n. sp. Text-figs. 5–8.

Occurrence :

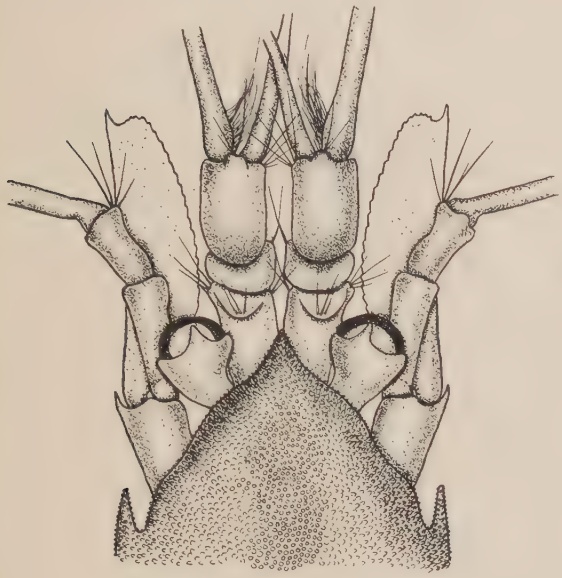
St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. One female, 13 mm.

St. 76. N. 200. 2500 m. 2800 m.w.o. One adult male, 20 mm.

St. 172. N. 200. 2091–0 m. 2665 m.w.o. One female, 17 mm. Type.

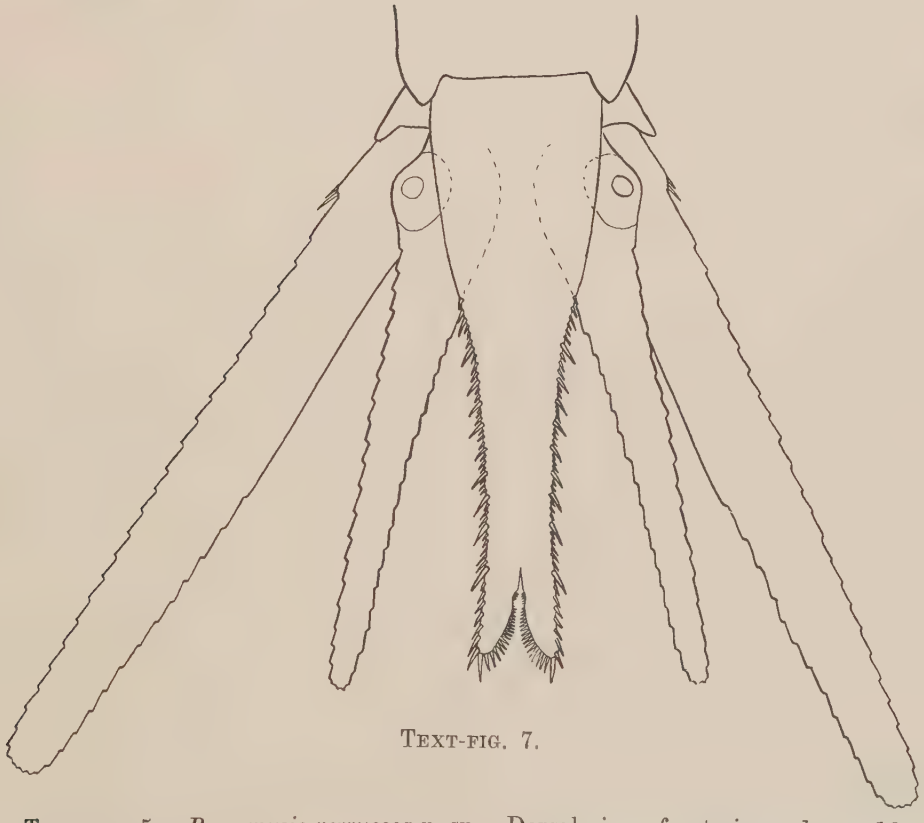
Description.—Whole of the thorax and abdomen covered by microscopic, evenly distributed tubercles, giving the integument the appearance of a very fine shagreen (Text-figs. 5, 6). Frontal plate (Text-fig. 5) considerably produced, extending forwards at least as far as the level of the eyes; margins feebly convex, the apex acuminate and somewhat upturned; front angle slightly less than a right angle; in side view (Text-fig. 6) the rostral plate is one-quarter of the length between its apex and the cervical groove. Eyes (Text-figs. 5, 6) somewhat small, about as broad as the stalk, light brown in colour; ocular tubercle prominent; in dorsal view (Text-fig. 5) only a narrow rim of the cornea visible, the major part of the cornea facing ventrally and outwardly. Antennal scale (Text-fig. 5) extending for one-quarter of its length beyond the antennular peduncle, four times as long as broad, broadest in the centre; inner margin more convex than the outer; terminal lobe not well developed, the outer marginal tooth extending beyond the apex of the scale. Exopod of the uropods (Text-fig. 7) with the unarmed proximal portion of its outer margin relatively short, about one-tenth of the total length, with two spines at the distal end. No spines on the inner margin of the inner uropods. Telson (Text-fig. 7) three and a quarter times as long as broad at the base, narrowing considerably in its distal

half, where the narrowest part is less than half the breadth at the base; terminal cleft one-sixth of the total length, the proximal part of the cleft with a distinct dilation and a narrow slit at the bottom; lateral margins armed for about the distal two-thirds of their length with a large number of spines arranged in groups. There are about ten spines of larger size, between which are smaller spines in groups of three to seven.



TEXT-FIG. 5.

TEXT-FIG. 6.



TEXT-FIG. 7.

TEXT-FIG. 5.—*Boreomysis verrucosa* n. sp. Dorsal view of anterior end. × 16.
TEXT-FIG. 6.—*Boreomysis verrucosa* n. sp. Lateral view of carapace. × 10.
TEXT-FIG. 7.—*Boreomysis verrucosa* n. sp. Telson and uropods. × 38.

I figure the second thoracic limb (Text-fig. 8) for comparison with that of *B. microps* (Text-fig. 4). It will be seen that in this new species there is practically no trace of a palmar margin bounded by a tooth, such as is characteristic of *B. microps*.

Length of an adult male, 20 mm., of an adult female, 17 mm.

TEXT-FIG. 8.—*Boreomysis verrucosa* n. sp. Second thoracic limb. × 29.

REMARKS.—This species is at once distinguished from all other described species by the character of the integument. I can find no other species in which the integument has been described as other than perfectly smooth. Otherwise the species is a typical bathypelagic member of the genus, closely allied to *B. microps*. It belongs to the small-eyed group of species, and the telson has the peculiar dilation in the apical cleft which is characteristic of *B. microps* G. O. Sars, *B. rostrata* Illig, *B. inermis* Hansen and other forms. The rostral plate recalls rather strongly that described in *B. rostrata* by Illig (1930).

Sub-family SIRIELLINAE.

Genus *Siriella* Dana.

Siriella thompsonii H. M.-Edw.

Siriella thompsonii, Hansen, 1910 (with full synonymy).

OCCURRENCE :

St. 61 C–D. N.S. 50. Surface. Six.
St. 145 D. N. 100. 50–0 m. One.

Siriella gracilis Dana.

Siriella gracilis, Hansen, 1910.

Occurrence :

St. 61 C–D. N.S. 50. Surface. Several hundreds.
St. 61 C–D. N. 100. 1000–0 m. 1136 m.w.o. Three.
St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. One.
St. 96. N. 200. 400–645 m. 900 m.w.o. One.

Remarks.—The occurrence of hundreds of this species at the surface at night is noteworthy. The species is an upper water form and its occurrence in the deep water tow-nettings must be regarded as accidental.

Sub-family Mysinae.

Tribe Erythropini.

Genus *Meterythrops* S. I. Smith.

Meterythrops indica Hansen.

Meterythrops indica, Hansen, 1910; Illig, 1930.
Meterythrops affinis, Coifmann, 1936 (1) and 1936 (2).

Occurrence :

St. 96. N. 200. 400–645 m. 900 m.w.o. One, 6 mm.

Remarks.—The specimen is immature, but appears to agree very well with Hansen's description and figures. There is one tooth on the outer margin of the antennal scale in addition to the terminal one. The apex of the telson bears two pairs of spines and a pair of plumose setæ. The inner pair of spines is about one-quarter as long as the telson and somewhat longer than the plumose setæ. The apical armature in Hansen's specimen was broken away.

I can see no valid grounds for separating *M. indica* and *M. affinis*. The latter has two or three teeth on the antennal scale, and the outer pair of spines on the telson is rather longer than in my specimen, but in all essential characters the two species are identical. Coifmann institutes an elaborate comparison between *M. affinis* and *M. picta*, but makes no reference to the relation which her species may have to *M. indica*. The latter is, in reality, very closely allied to *M. picta*, and the differences between the two species are very slight. Even the colouring of the two forms is similar and characteristic, the prominent reddish-brown coloration of the gastric region being a feature of *M. picta* as well as *M. indica*.

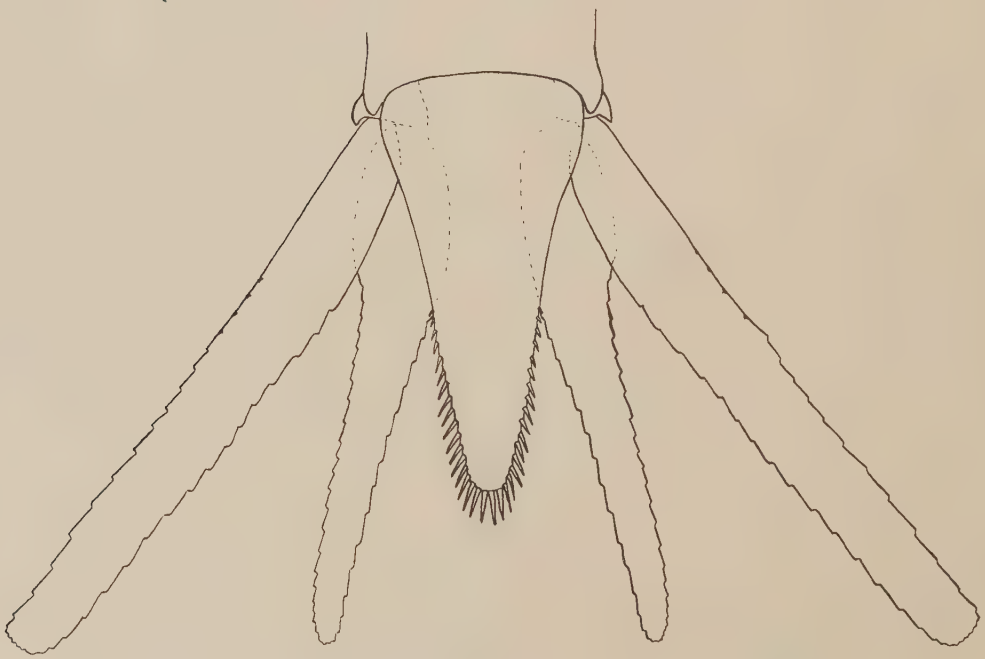
Distribution.—Hansen records this species from the waters of the Dutch East Indies. Illig noted its capture in the Indian Ocean to the East of Ceylon, and also from two stations in the Gulf of Aden. Illig also records a small specimen from the Atlantic Ocean, S.W. of Cape Bojador. Coifmann's material of *M. affinis* was from the Gulf of Aden.

Dactylamblyops murrayi n. sp. Text-figs. 9, 10.

Occurrence :

St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. One female, 12 mm., and one juv., 5 mm.

TEXT-FIG. 9.—*Dactylamblyops murrayi* n. sp. Dorsal view of anterior end. × 40.



TEXT-FIG. 10.—*Dactylambyops murrayi* n. sp. Telson and uropods. × 60.

Description.—Small, somewhat slender in form. Frontal plate (Text-fig. 9) somewhat produced, extending forwards slightly beyond the eyes and almost to the distal end of the basal joint of the antennular peduncle, slightly less than twice as broad as long, apex bluntly rounded. Eyes (Text-fig. 9) small, pale golden brown in colour; ocular process long, projecting well beyond the cornea, and free of the eyestalk for the greater part of its length. Antennal scale (Text-fig. 9) rather longer and narrower than in most species of the genus, extending for nearly one-third of its length beyond the antennular peduncle, five times as long as broad; outer margin terminating in a spine, which is about on the same level as the apex of the scale. Outer uropod twice as long as the telson. Inner uropod one and a half times as long as the telson, with a single spine on the inner margin in the region of the statocyst. Telson (Text-fig. 10) rather elongate triangular in shape, twice as long as broad at its base, lateral margins feebly concave, with the distal half armed by about 28 rather closely-set spines, increasing gradually but only very slightly in size towards the apex; no terminal plumose setæ. Length of a not quite adult female, 12 mm.

It should be explained that the figure of the telson and uropods (Text-fig. 10) was made from the small specimen. The outer uropods are considerably shorter than in the larger specimen, and the telson has only 18 spines on each lateral margin.

The figures, however, serve to show the general form and armature of those appendages in the species and the differences are merely those due to age.

Remarks.—This species is most closely allied to *D. fervida* Hansen, and *D. latisquamosa* Illig, but differs from both of them in the longer and narrower antennal scale and in the longer ocular process. In both these species the antennal scale is somewhat shorter than the antennular peduncle and only about twice as long as broad, while the ocular process in both is quite short, with only its terminal surface free. *D. murrayi* has the rostral plate of essentially the same form as in *D. fervida*. In *D. latisquamosa* the rostral plate has an acute apex, and is somewhat longer and narrower than in the other two species.

Genus *Synerythrops* Hansen.

Synerythrops intermedia Hansen. Text-figs. 11–13.

Synerythrops intermedia, Hansen, 1910.

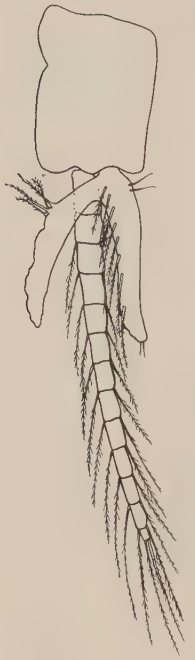
Occurrence :

St. 25. Agassiz trawl. 620 m. One male, 13 mm.

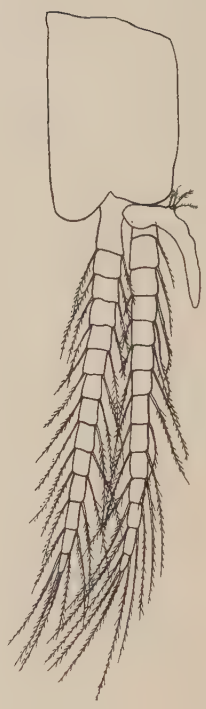
Remarks.—The occurrence of an adult male allows of the description of the pleopods of the male in this genus. They have essentially the general structure of those in males of the genus *Erythrops* and its allies, but are interesting by reason of the fact that the pseudobranchial processes of the endopods are in the form of a long narrow lobe (Text-figs. 12, 13), instead of the much shorter plate-like appendage. In the first pleopod this process is as long as the endopod itself. Otherwise there are no modifications on any of the pleopods. I figure the distal joints of the endopod of the third thoracic limb to show the form of these appendages (Text-fig. 11). The eye has a small ocular papilla on the inside of the cornea. There are two spines on the inner margin of the inner uropod.

Distribution.—This species is known from the waters of the East Indies (Hansen, 1910), and doubtfully from the Great Barrier Reef. It has not previously been recorded from the Indian Ocean.

Text-fig. 11.



Text-fig. 12.



Text-fig. 13.

Text-figs. 11–13.—*Synerythrops intermedia* Hansen. Fig. 11.—Endopod of third thoracic limb. × 29. Fig. 12.—First pleopod of the male. × 29. Fig. 13.—Second pleopod of the male. × 29.

Thalassomysis gen. nov.

Diagnosis.—Integument thin and membranous. Carapace without rostral plate, front margin evenly arcuate and slightly upturned. Antennal scale setose all round, without a terminal spine on the outer margin. Labrum very aberrant and asymmetrical; left half of the posterior margin of more or less normal form, right half produced into a strongly chitinized blunt recurved and rather hook-like process, covered with microscopic tubercles, which appears to work against the right mandible and possibly acts as an additional grinding or triturating organ. Left mandible with the incisive part and the movable process well developed; four setæ between the movable process and the molar process, which is somewhat truncate. Right mandible with a row of five spines between the incisive part and the rather sharply pointed molar process. Second joint of the mandibular palps narrower than is usual. Maxillules with six cylindrical or sausage-shaped processes on the endopodite in addition to more normal setæ. Remaining mouth-parts and thoracic appendages not presenting any special characters of generic value. First thoracic limb with both exopodite and epipodite. Second thoracic limb with well-developed exopodite. Telson extremely long and narrowly pointed, longer than the inner uropod; apex entire without terminal incision, lateral margins armed with numerous spines on the distal portions; no plumose setæ at the apex.

Type : *Thalassomysis sewelli* sp. nov.

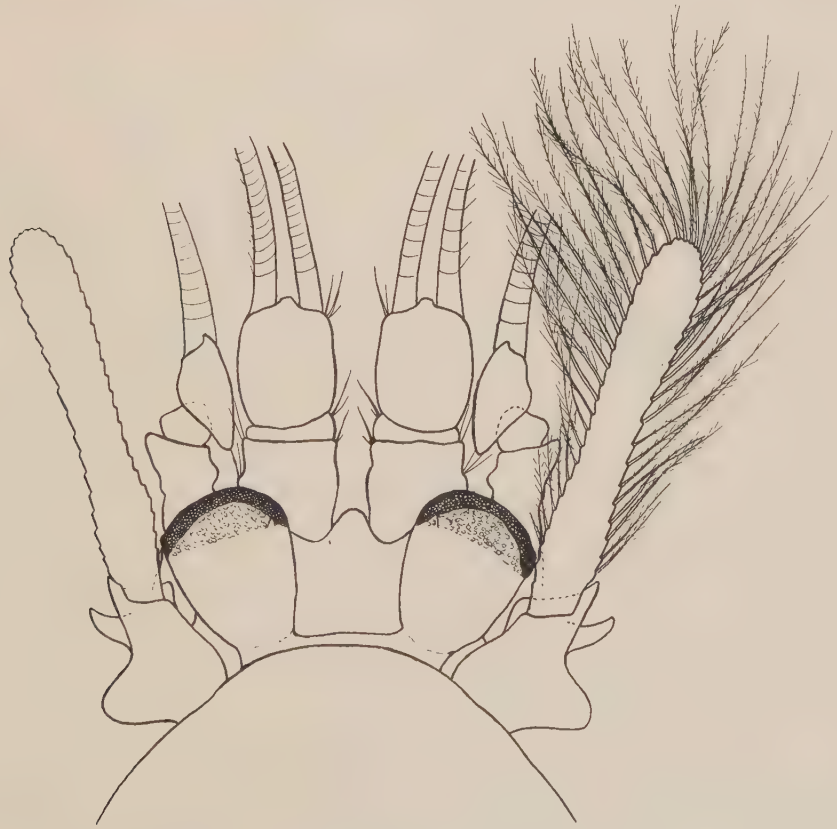
Remarks.—This new genus is distinguished at once by the characters of the antennal scale and the telson. The labrum and maxillules present features unknown elsewhere in the group. In the absence of male specimens it is impossible to say to what tribe this genus should be referred. In its general form and in the form and structure of the majority of its appendages it shows the closest resemblance to the members of the Erythropini, and I regard it as a somewhat aberrant, oceanic and bathypelagic member of that group. The antennal scale without outer terminal spine and with setæ all round its margins recalls in a general way that of the Leptomysini, but there is no distal joint and the setæ are long and slender, and less stiff than those in this tribe. A somewhat similar scale is found in *Echinomysis*, but in this genus the proximal part of the outer margin is devoid of setæ, though without terminal spine. In fact *Thalassomysis* is closely allied to *Echinomysis* and the group of deep-water genera to which it belongs.

Thalassomysis sewelli sp. nov. Text-figs. 14–21.

Occurrence :

St. 61 C–D. N. 100. 1500–0 m. 1702 m.w.o. Two females, 12 mm.

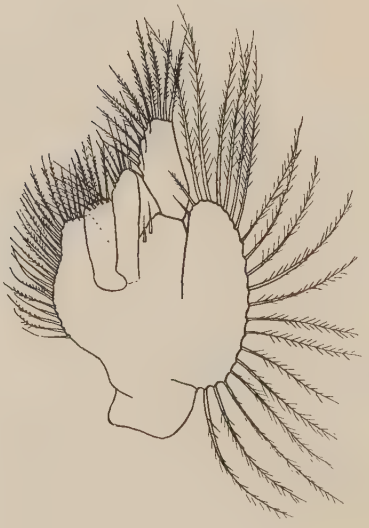
Description.—Integument thin and membranous. Carapace covering the whole of the thorax; rostral plate (Text-fig. 14) hardly developed at all, the front margin of the carapace being broadly and evenly rounded and somewhat upturned, so that the whole of the eyes and eyestalks and the region between them and the bases of the antennules and antennæ are exposed, antero-lateral corners rounded and not produced. Eyes (Text-fig. 14)



Text-fig. 14.—*Thalassomysis sewelli* gen. et sp. nov. Dorsal view of anterior end. × 24.

TEXT-FIG. 15.

TEXT-FIG. 16.



TEXT-FIG. 17.

TEXT-FIG. 18.

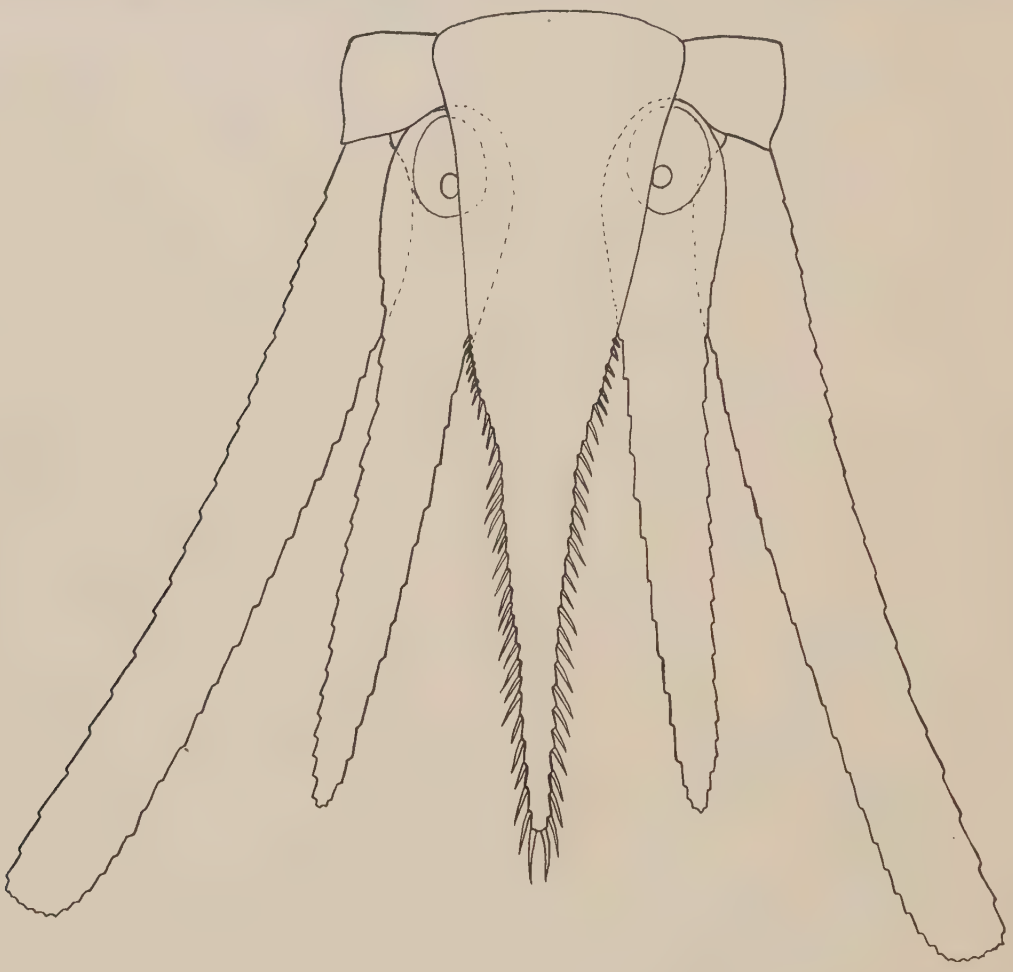
TEXT-FIGS. 15–18.—*Thalassomysis sewelli* gen. et sp. nov. FIG. 15.—Right and left mandibles and labrum viewed from below. × 50. FIG. 16.—Maxillule. × 50. FIG. 17.—Maxilla. × 40. FIG. 18.—Endopod of the first thoracic limb. × 40.

TEXT-FIG. 19.

TEXT-FIG. 20.

TEXT-FIGS. 19, 20.—*Thalassomysis sewelli* gen. et sp. nov. FIG. 19.—Endopod of the second thoracic limb. × 26. FIG. 20.—Endopod of the third thoracic limb. × 26.

small and flattened, most of the cornea on the under-side so that in dorsal view only a narrow arc of cornea is visible; a small ocular papilla situated on the inside of the stalk at the margin of the cornea, pigment dark brown. Second joint of the antennular peduncle exceptionally short. Antennal scale (Text-fig. 14) extending for one-quarter of its length beyond the antennular peduncle, at least six times as long as broad at its widest part, narrowly oval in shape and somewhat narrower in the centre than at either end, setose all round, the setæ very long and slender. Antennal peduncle (Text-fig. 14) shorter than



Text-fig. 21.—*Thalassomysis sewelli* gen. et sp. nov. Telson and uropods. × 40.

the antennular; second joint short and narrower than the first and third, the third joint with a well-developed backwardly directed lobe overlying the second joint. Labrum (Text-fig. 15), mandibles (Text-fig. 15) and maxillulæ (Text-fig. 16) as in the generic definition. Terminal joint of the palp of the maxillæ (Text-fig. 17) two and a half times as long as broad. First thoracic limbs with both exopod and epipod; endopod (Text-fig. 18) with a well-developed gnathobasic lobe from the second joint. Second thoracic limb with well-developed exopod; endopod (Text-fig. 19) moderately long and robust, fifth joint longer than the sixth, sixth joint with a feebly developed palmar margin on the inner distal side, seventh joint short and thick, densely setose and terminating in a short claw. Endopods of the remaining thoracic limbs (Text-fig. 20) long and slender, sixth joint subdivided into three subjoints by two vertical articulations, the first subjoint about twice as long as the

other two combined. Last thoracic somite nearly twice as long as the fifth. Telson (Text-fig. 21) longer than the sixth abdominal somite, six times as long as broad at its base, very elongate and narrowly triangular in shape, longer than the inner uropod, but shorter than the outer; distal two-thirds of its lateral margins armed with about thirty rather long spines; apex narrowly truncate and armed with one pair of spines, which are about three times as long as the apex is broad; no apical plumose setæ. No spines on the inner margin of the inner uropods. Length of an adult female, 12 mm.

Remarks.—The distinguishing features of this interesting species are to be found in the antennal scale and the telson. The combination of these two characters is quite unlike anything else to be found in the group. The peculiar labrum and maxillulæ also serve to differentiate it from any other species. It is the most interesting Mysid in the collection.

Genus *Euchaetomera* G. O. Sars.

Euchaetomera typica G. O. Sars.

Euchaetomera typica, G. O. Sars, 1885; Tattersall, 1911 (2); Illig, 1930.
Brutomysis vogtii, Chun, 1896.
Euchaetomera limbata, Illig, 1906 (1).
Euchaetomera sennæ, Colosi, 1920.

Occurrence:

St. 172. N. 100. 200–0 m. 510 m.w.o. One.

Distribution.—This species has been recorded from the Indian Ocean by Tattersall (1911 (2)) and Illig (1930). It has a world-wide distribution in the tropical and sub-tropical waters of the globe.

Euchaetomera tenuis G. O. Sars.

Euchaetomera tenuis, G. O. Sars, 1885; Hansen, 1910 and 1912; Zimmer, 1914; Illig, 1930.
Euchaetomera fowleri, Holt and Tattersall, 1905.

Occurrence:

St. 131 D. N. 100. 500–0 m. One female, 11 mm.

Distribution.—This species has been recorded from the Indian Ocean by Illig. It has a similar distribution to that of *E. typica*.

Euchaetomera oculata Hansen.

Euchaetomera oculata, Hansen, 1910; Tattersall, 1911 (2); Illig, 1930; Coifmann, 1936 (2).

Occurrence:

St. 96. N. 200. 400–645 m. 900 m.w.o. One female, 7 mm.

Remarks.—This species is known only from the Indian and Pacific Oceans. It has been recorded from the Indian Ocean by Tattersall (1911 (2)), Illig (1930), and Coifmann (1936 (2)).

Euchaetomera glyphidophthalma Illig.

Euchaetomera glyphidophthalma, Illig, 1906 (1); Zimmer, 1914; Illig, 1930.

Occurrence:

St. 186. N. 100. 575–0 m. 880 m.w.o. One female, 8 mm.

Distribution.—This is the first record from the Indian Ocean. All Illig's material came from the Atlantic Ocean, and the species has also been recorded from the Mediterranean by Zimmer and Colosi.

Genus *Echinomysis* Illig.

Echinomysis chuni Illig.

Echinomysis chuni, Illig, 1905 (2), 1912 and 1930.

Occurrence :

St. 172. N. 100. 400–0 m. 820 m.w.o. One female, 11 mm.

Remarks.—The single specimen is in complete agreement with Illig's description and figures. Coifmann (1936 (2)) has described a second species of the genus, *E. distinguenda*, from the Gulf of Aden on the evidence of a single male specimen. It is very closely allied to *E. chuni*, but much more material is necessary before it can be decided whether the very trivial differences between the two forms have a real specific value.

Distribution.—Illig (1930) records this species from eight stations altogether, seven in the Indian Ocean (five within the area covered by this report) and one in the Atlantic Ocean, in the Gulf of Guinea off Lagos.

Genus *Gibberythrops* Illig.

Illig (1906 (1)) described two species of Mysids from the Indian Ocean in the neighbourhood of Aden under the names *Parerythrops acanthura* and *Erythrops brevisquamosa*. In 1930 he made the former species the type of a new genus, *Gibberythrops*, and referred the latter species, with some doubt, to the genus *Hypererythrops*. Coifmann (1936 (2)), who examined the same two species from material collected in the same locality, referred both species to the genus *Erythrops* on the grounds that the pleopods of the male conform to the type met with in males of that genus, and that *E. brevisquamosa* did not possess the scythe-like spines on the sterna of the thoracic somites of the male which are characteristic of the genus *Hypererythrops*. Coifmann, however, retained the genus *Gibberythrops* as a sub-genus of *Erythrops* for *E. acanthura*. Neither species, however, has the kidney-shaped eyes or the characteristic telson of the genus *Erythrops*, and it is doubtful whether they can legitimately remain in that genus. Both are small-eyed forms with the general aspect of species of the genus *Katerythrops*, but again the form of the telson precludes certain reference to that genus. For the present it seems best to retain the genus *Gibberythrops* for *P. acanthura* Illig, and to refer *E. brevisquamosa* Illig to the same genus. The two species are closely allied, having the same type of eye, antennal scale and telson. I can confirm Coifmann's account of the two species, in so far as the relatively poor state of preservation of my material allows.

Gibberythrops acanthura (Illig).

Parerythrops acanthura, Illig, 1906 (1).
Gibberythrops acanthura, Illig, 1930.
Erythrops (*Gibberythrops*) *acanthura*, Coifmann, 1936 (2).

Occurrence :

St. 96. N. 200. 400–645 m. 900 m.w.o. One male, 6·5 mm.
St. 186. N. 100. 575–0 m. 880 m.w.o. Two females, 6–7 mm.
St. 186. N. 100. 600–0 m. 1150 m.w.o. One male, 6 mm.

Distribution.—This species is only known from the Indian Ocean.

Gibberythrops brevisquamosa (Illig).

Erythrops brevisquamosa, Illig, 1906 (1) ; Coifmann, 1936 (2).
Hypererythrops brevisquamosa, Illig, 1930.

Occurrence :

St. 186. N. 100. 600–0 m. 1150 m.w.o. One male, 6 mm.

Distribution.—Like the last species, this form is only known from the Indian Ocean.

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